

THE IRON AGE

Established 1855

New York, February 20, 1913

Vol. 91: No. 8

Sheet Steel Pipe Plant at Richmond, Cal.

Equipment of the Western Pipe & Steel Company for Making Light and Heavy Riveted Pipe, Tank and Other Sheet Metal Work

The Western Pipe & Steel Company of California was organized in 1907 at Los Angeles and took over the plant of the Thompson & Boyle Company. The business grew so rapidly that the company was reorganized in 1910, and in May of that year took over the business of Frances Smith & Co. of San Francisco. At the present time, the company is operating factories at Los Angeles, Taft and Richmond. The first of these is also the oldest and all the company's work for the southern part of the State as well as for Arizona, Utah and Mexico is turned out here. The Taft factory is located in the center of the oil fields and the work there consists principally of tanks and oil well casings. The output of the other two plants is a general class of sheet metal and plate work, in addition to the manufacture of riveted, galvanized surface irrigation and dredging pipe, well casing, steel and galvanized tanks and steel flumes, heaters and smokestacks.

After the purchase of the Frances Smith business in San Francisco, twelve acres of land was purchased at

Richmond, Cal., where a new factory was pushed rapidly to completion. This was modeled after the Los Angeles one with several minor changes and was completed in October, 1911, all of the machinery from the recently acquired San Francisco plant being moved to the new factory. The location of the plant is found favorable for economical manufacturing. A spur track from the main line of the Atchison, Topeka & Santa Fé Railway runs into the yard and directly under the traveling crane in the assembling shop. Additional transportation facilities are afforded by the Southern Pacific Lines and the Richmond Belt Railway which runs past the property. It is planned to build a spur connection from the Southern Pacific Lines in the near future and water transportation facilities will be greatly improved by the completion of the Richmond Inner Harbor project which is now under way, the docks being located less than $\frac{1}{4}$ mile from the factory.

The main building is laid out in three sections, as will

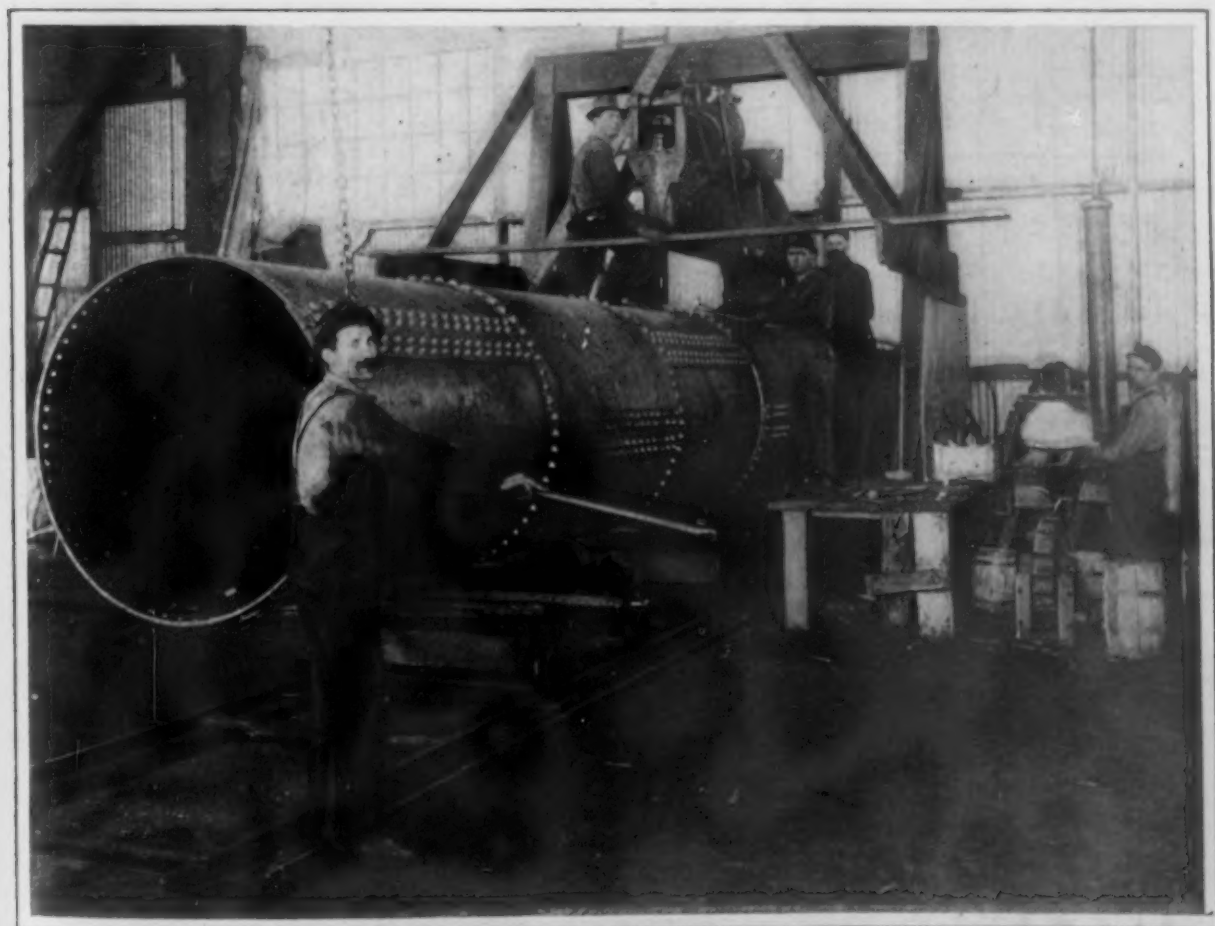


Fig. 1—View in the Assembling Shop Showing a Pneumatic Riveting Machine at Work on 48-In. Pipe for a Penstock. The Plates Are $\frac{3}{4}$ In. Thick and Are Riveted with $1\frac{1}{4}$ -In. Rivets

be noticed by referring to Fig. 2. The east wing, which is 52 x 256 ft., with a 40 x 96 ft. L-shaped extension, contains all the machinery and tools for the manufacture of light riveted water pipe and well casing. The north end of the wing contains all of the machinery, the smaller machines being driven from a main lineshaft, while the larger ones have individual motor drive.

The west wing, which is slightly larger, measuring 60 x 256 ft., is devoted to the manufacture of heavy plate work, heavy riveted pipe and tanks. All of the machines in this wing have individual direct-connected motor drive and all of them are served with jib cranes, equipped with electric hoists. The toolroom is located in the north end of this wing.

The main section of the building, which is used as an assembling shop, measures 72 x 385 ft. and is served by an electric traveling crane, running the entire length of the building. The extreme north end of the shop is used for the storage of plates and sheets, the material being directly unloaded from the cars which are switched under the crane. The only machinery in this shop is the pneumatic riveting machines at the extreme southern end and the special machinery for the manufacture of galvanized surface irrigation pipe, located along the east wall. In Fig. 1 a portion of this shop is reproduced, showing one of the pneumatic riveting machines at work on pipe 48 in. in diameter for a penstock. The plates are $\frac{3}{4}$ in. thick and are riveted with $1\frac{1}{8}$ -in. rivets. It will be noticed from the engraving that the pipe is brought under the machine on low four-wheel trucks. To facilitate the turning of the pipe for riveting, chains which are fastened at the end to bolts in the work are run through overhead pulleys and

the pipe is turned on the cars by placing a crowbar in one of the holes. Along the east wall of the assembly shop there is a set of 10-ft. light rolls and a special power riveting machine, which has been developed and patented by the company for the manufacture of light galvanized irrigation pipe. This machine will rivet a 10-ft. section of pipe in one operation and has a capacity of from 4000 to 5000 ft. per day. It is so arranged that pipe from 6 to 12 in. in diameter can be riveted, the changes necessary to accommodate different sizes being made in less than $\frac{1}{2}$ hr.

To the north of the west wing and connected to the main assembling shop is the dipping shed. The dipping kettle is equipped with burners for using crude oil as fuel and is served by an electric crane. The riveted pipe is carried by the traveling crane in the main building from the riveting stakes to the skids running from the dipping kettle into the assembling shop. From here it is handled by the electric crane which serves the dipping kettle and the skids extend from the west side of the dipping kettle to the storage yard, where space is provided for about 200,000 ft. of pipe of different sizes. A revolving crane with an electric hoist is employed to load the pipe from the storage yard upon the cars for shipment.

In the heavy pipe department the plates are taken from the storage space in the north end of the assembling shop and are carried by the traveling crane to the southwestern end. Here they pass successively through the shearing and punching machines, the scarfing hammers and rolls and are finally delivered to the assembly shop for riveting. The plate is then riveted by pneumatic yoke riveting machines, the compressed air for this operation and the caulking

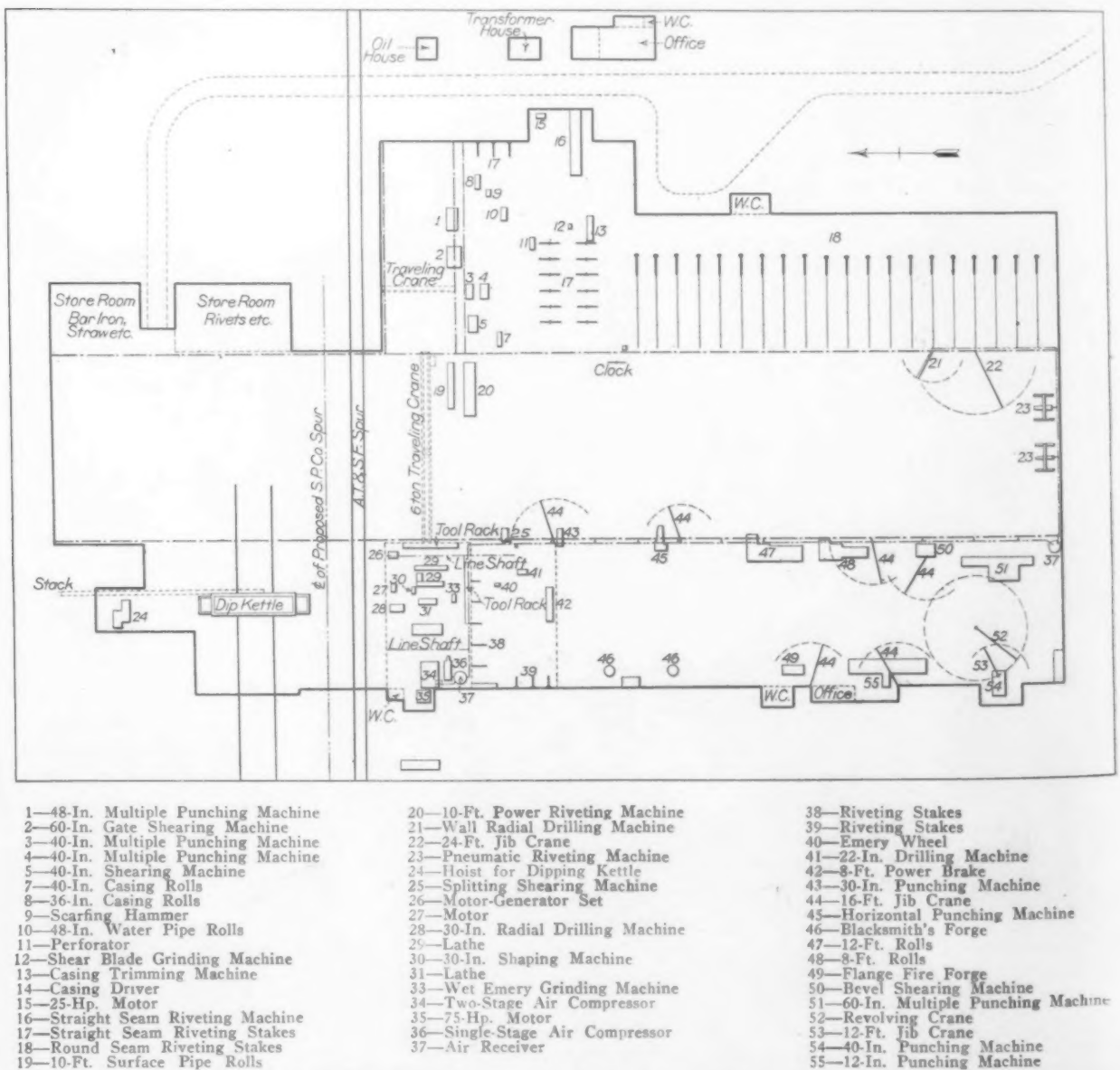


FIG. 2—GROUND PLAN OF THE RICHMOND PLANT OF THE WESTERN PIPE & STEEL COMPANY.

being supplied at a pressure of 100 lb. by a motor-driven Ingersoll-Rand air compressor located in the toolroom. The capacity of this compressor is 500 cu. ft. and a smaller compressor of 150 cu. ft. is used as an auxiliary.

All of the machinery in the factory is driven by electric motors. Some of the smaller machines in the pipe shop and in the toolroom are driven from lineshafts while all of the larger machines have their own individual direct-connected motors. Alternating current at a potential of 2200 volts is led into the plant and is stepped down to 440 volts before being used. In the toolroom there is a 25-kw. motor-generator set which is employed to generate direct current at 220 volts for the traveling crane and the electric hoists. With this exception alternating current is used throughout the plant. The transformer house is located on the east side of the main building and is a separate structure.

The arrangement of the machinery and the routing of the work were given considerable thought, with an idea of obtaining the minimum loss of time. In the water pipe department the sheets are unloaded from the cars to a storage space directly back of the shearing and gang punching machines in the north end of this department. From here they pass through the shearing machines, the gang punching machines, the scarfing hammers and the rolls, which are so arranged as to eliminate any extra handling of material. After this three or four rivets are put in each section of pipe to hold it together while running through the straight seam riveting machine. The rivets are "stuck" in by hand and are riveted on a power machine that operates by direct pressure on a large stake upon which the pipe is placed after the rivets have been put in. A roller carriage operated by a screw feed travels forward and back over a die plate in which are placed sets for forming the rivet heads. This machine turns out about 1200 ft. of pipe per day, and from here the sections are taken to a round seam stake where the sections are riveted together into lengths of from 20 to 25 ft. The completed sections are next moved out into the assembling shop and are picked up by the crane and carried to the dipping kettle. The riveted pipe turned out in this department is made from 4 to 30 in. in diameter and from steel of No. 16 to No. 7 gauge. It is used principally for irrigation, hydraulic mining, water supply systems and for small power plants.

The machines for the making up of well casing adjoin the punching and shearing machines for the water pipe. The material goes successively through the shearing and punching machines and the rolls to the riveting stakes and from there to a trimming machine where the ends are squared up. The sections go from here to the drive stakes, where the casing is made into sections, ranging from 10 to 20 ft. in length and is then placed under the crane in the assembling shop.

Some idea of the output of this plant can be obtained from an examination of Figs. 3 and 4. The first is a view of the north end of the assembling shop and shows some riveted $\frac{3}{4}$ -in. steel plate elbows, 48 in. in diameter with special ends for connection to continuous wood stave pipe of the same size. In the upper portion of Fig. 4 is shown a cone-shaped suction chamber for a gold dredge which is made of $\frac{5}{16}$ -in. plates. This chamber is 12 ft. in

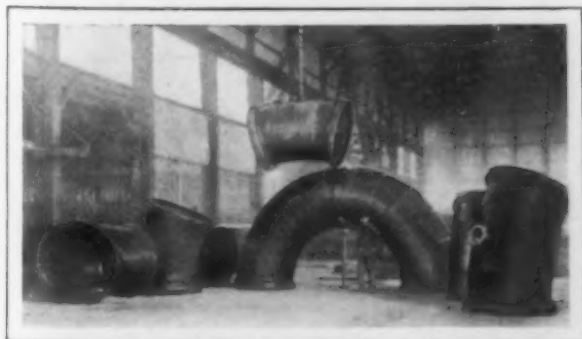


Fig. 3—Some Typical Products of the Plant

diameter at the center and is 12 ft. long. In the foreground of this engraving is shown some 22-in. pontoon pipe for a suction dredge made from $\frac{3}{4}$ -in. plate with

double riveted girth seams and reinforced ends. Other work recently completed by the company include two feed water heaters and purifiers 54 in. in diameter, a

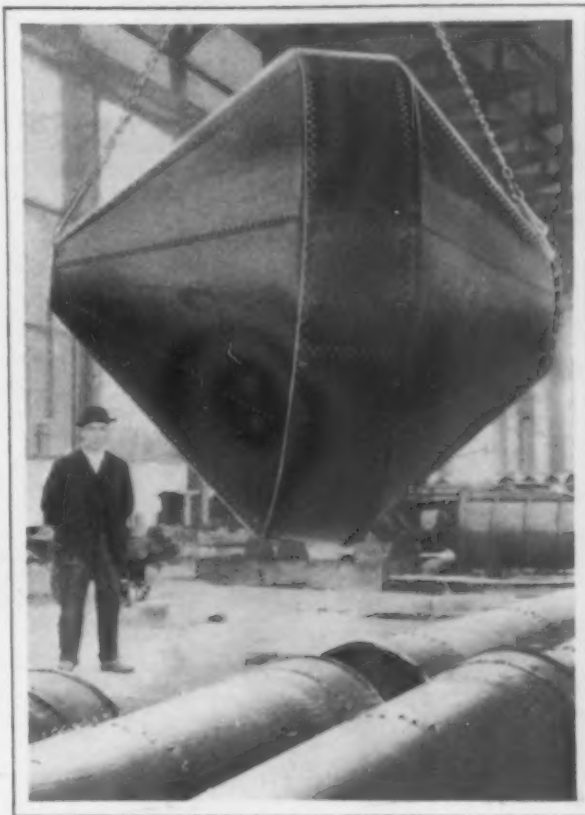


Fig. 4—More Products of the Plant Used in Suction Dredge Work

cylindrical oil storage tank 10 ft. in diameter and 40 ft. high, a 48-in. suction pipe for use in connection with a land reclamation project, 60-in. penstock pipe made of $\frac{1}{4}$ -in. steel plates, and some double oil well casings 18 in. in diameter, made from No. 10 gauge steel. All of this work was completed before it left the plant and in addition plates for a pipe line 104 in. in diameter were cut, punched and rolled. This pipe line is composed of $\frac{5}{16}$ and $\frac{3}{8}$ in. plates and will be erected in the field.

The Werra Aluminum Company

One of the largest aluminum foundries in the Middle West will be established at Waukesha, Wis., by the Werra Aluminum Company, which has just been organized by Conrad Werra and Alex Pankratz of Manitowoc, Wis., pioneer aluminum foundrymen. The company has been incorporated with a capital stock of \$110,000. E. F. Pfeffer of Waukesha is an associate in the enterprise. The company has taken a long-term lease on the shops of the Wisconsin Central Railway Company, which were abandoned about three years ago when Waukesha was abolished as a division point. The buildings are now being altered for foundry purposes and contracts are now being placed for the equipment.

Mr. Werra established the Aluminum Foundry Company at Manitowoc 14 years ago. In 1909 the plant was purchased by the Aluminum Castings Company, an Eastern corporation, which made the Manitowoc plant its western branch. Mr. Werra continued as general manager, and his general superintendent, Mr. Pankratz, remained with the new company as factory superintendent. The Aluminum Castings Company has not yet appointed successors to them. Mr. Werra will remain in charge of the Manitowoc works for some weeks, while Mr. Pankratz is at Waukesha, superintending the establishment of the new works, which will have three times the capacity of the Manitowoc foundry.

The Chicago Steel Car Company, with plant at Harvey, Ill., has filed notice of a decrease in its capital stock from \$250,000 to \$125,000.

Use of Waste Heat of Open Hearth Furnaces

Losses Reduced by About 40 Per Cent. by Conducting the Gases to a Boiler Plant —Details of Construction and Results

Methods for the use of some of the heat of waste gases from open hearth furnaces have been advocated for some time, and in this connection a paper in the issues of *Stahl und Eisen* for January 9 and 16, 1913, is of great interest. It is by Superintendent J. Schreiber of the Phoenix plant in Duisburg-Ruhrort, and describes the installation there for raising steam with the waste gases, giving also the results obtained. References to the work of Mayer and Springorum show that from 29 to 32 per cent. of the heat developed in the open hearth process is carried away by the waste gases. The theoretical temperature at which the waste gases should enter the chimney is given at 300 deg. C., a temperature which

producer, blast furnace and coke oven gas, and an average of 780 deg. C. when using mixed producer and coke oven gas. This 30 per cent. of the heat developed which is carried away by the waste gases must not be considered as altogether lost, because it produces a considerable draft in the chimney which is necessary to carry on the operation.

The experiments carried out by Herr Wibberenz from the beginning of October, 1911, to the end of February, 1912, are briefly described. A 10-ton furnace was used at the plant of the Gelsenkirchener Guss-Stahl und Eisenwerken and 350 heats were made after the boilers were connected. Exact figures as to the amount of steam raised could not be obtained owing to the local conditions, but a comparison with the preceding year showed that 1.15 tons of steam were raised per ton of coal used in the producers. The furnace was slowed down somewhat owing to the long narrow gas conduit to the boilers and the coming together of the waste gases from the furnace

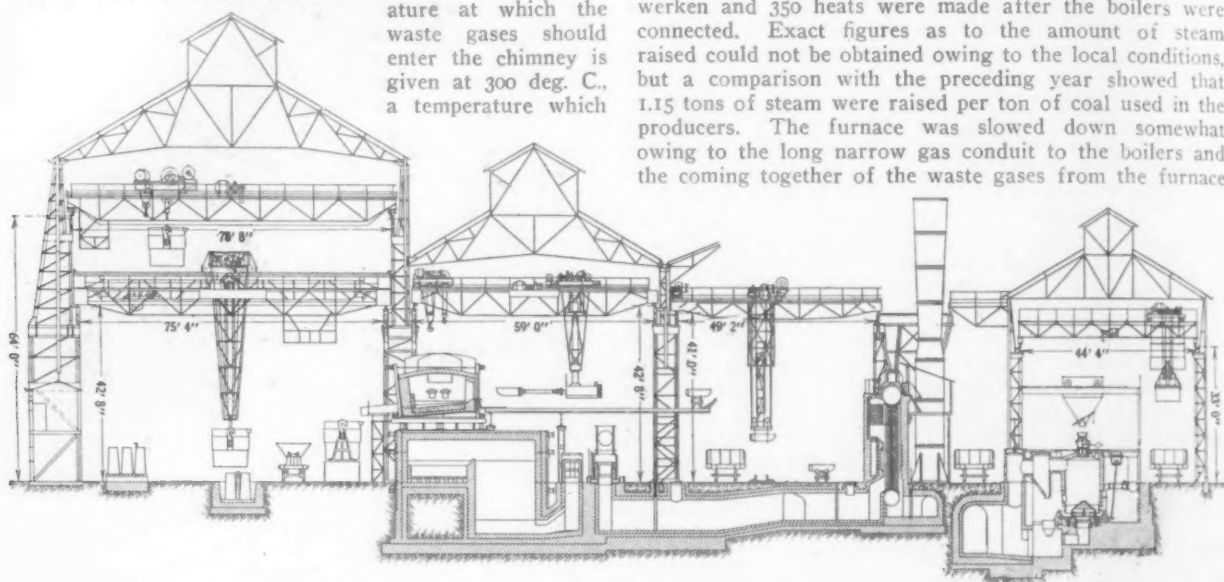


Fig. 1—Cross Section of Open Hearth Plant Equipped with Waste Heat Boilers

is not reached in practice, because with active operation it is unavoidable that a considerable part of the hot gases burn while passing through the ports and checkers or even after leaving the reversing apparatus. Even if it were possible that by some arrangement the temperature of the gas and air entering the hearth could be kept constant between reversal periods, the theoretical waste gas temperature is only lowered to 273 deg. C., or about 10 per cent. less than 300 deg. C.

As a matter of fact the waste gas temperatures are considerably higher with most open hearth furnaces. In general they may be given as from 600 to 700 deg. C., but with active working they are often much higher. If lower figures are obtained the reason may not be better furnace efficiency, but greater radiation losses before the gases enter the checkers, or loose brick work allowing the entrance of cold air. These temperatures hold good for the ordinary scrap process and it is natural that higher ones should be obtained when liquid metal is used. Springorum gives 630 deg. to 960 deg. C. for the Hoesch process, but here the temperature of the producer gas was proportionately high, being 800 to 870 deg. C. The use of cold gas, such as mixtures of coke oven and blast furnace gas, should give lower figures. Simmersbach found an average of 565 deg. C. when using a mixture of coke oven and blast furnace gas, and 560 deg. C. when using coke oven gas alone. A private communication gives results of 450 to 500 deg. C. when using a mixture of pro-

ducer and the neighboring boilers, and as the necessary changes could not be made the boiler plant was disconnected. If a boiler plant were connected to a 50-ton furnace it would need a much larger chimney to give the necessary draft, because there is the increased resistance of the boilers to be overcome, and also the gases will enter the chimney at a much lower temperature than before. Accordingly when in 1909 the introduction of waste heat boilers was considered for the new Phoenix plant, it was resolved to experiment with the use of artificial draft on an old 20-ton furnace. It was decided to use the Schwabach patented

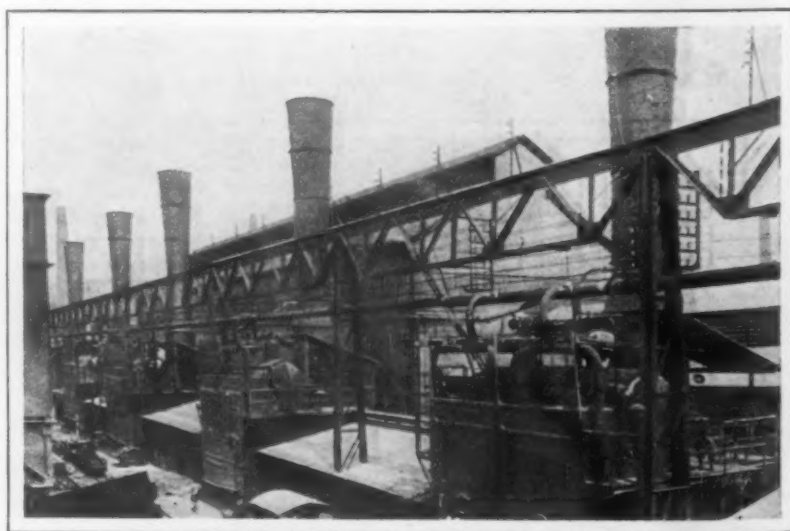


Fig 2—View of Waste Heat Boilers, with Intermediate Buildings Containing Feed Pumps, Motors, Etc.

method to produce the suction, and a boiler with 1378 sq. ft. heating surface together with a Schwabach apparatus was installed. The test was satisfactory to the extent that the operation of the furnace was not slowed down; on the contrary a speeding up was possible. The boiler, however, was too small, for the waste gases were only cooled down from 700 and 750 deg. C. to 400 and 450 deg. C. It was concluded to install a sufficiently large suction plant for the 30-ton furnaces in the new plant, and as the results were satisfactory the 50-ton furnaces were also equipped.

To carry out the Schwabach method a fan draws cold air from the atmosphere and blows it into the chimney-like suction apparatus, which takes the place of the ordinary chimney, and is provided with arrangements like tuyeres. The proper pressure is determined by experiment, and the strength of the suction exerted on the gases of combustion depends on the size of the fan, the revolutions per minute, and the area of the tuyeres. The latter can be regulated by means of a rising and falling double cone arrangement. The waste gases, after they have mixed with the air from the tuyeres, which produce the suction, are blown out through a short chimney which widens toward the top. It must be admitted that the combination of a boiler and suction plant with an open hearth furnace may appear to bring about an undesirable and unsuitable complication. It should be remembered, however, that the gas producer and the whole furnace operation rest on the certainty of operation of boilers, motors and fans, and that with good construction and suitable arrangement there should be no trouble. The plant must further be kept in very good condition, and above everything else looseness in the construction must be avoided.

Meanwhile the advantages are considerable and weighty. First comes the absolute independence in regard to the influence of weather on the draft; further the possibility of bringing about good working with an old furnace in the flues and checkers of which deposits have formed. Next is the very satisfactory regulation of the draft, by means

of which the furnace is under complete control; the complete elimination of chimney valves which always give trouble, and finally, but not the least valuable, the possibility of using a certain amount of the waste heat without damaging the furnace operation.

The new open hearth plant at Ruhrort has five furnaces—three of 50 tons capacity, one of 30 tons, and one that was originally 30 tons but has been increased to 40 tons. A general cross section of the plant is shown in Fig. 1 and a more detailed drawing of the waste heat arrangement in Fig. 3. The waste gases are led from the reversing valve to the boilers through a conduit 49 ft. 2 in. (15m) long. Two boilers are provided for each furnace, those for the two smaller furnaces having 2153 sq. ft. of heating surface and 538 sq. ft. overheating surface. Those for the 50-ton furnaces have 2691 and 700 sq. ft. respectively. Two boilers are used, so that if one boiler is shut down for any reason the gases can still be used under the other, and some heat utilized. The conduit, therefore, forks in front of the boilers, and the separate channels can be closed by valves if necessary for relining. Fig. 3 also shows a conduit leading from the waste gas conduit around the boilers directly to the base of the suction apparatus. As a rule this is not used; but in case both the boilers are down the hot waste gases can be conducted through it. For this reason the steel chimney-like pipe, which is 56 or 69 ft. high,

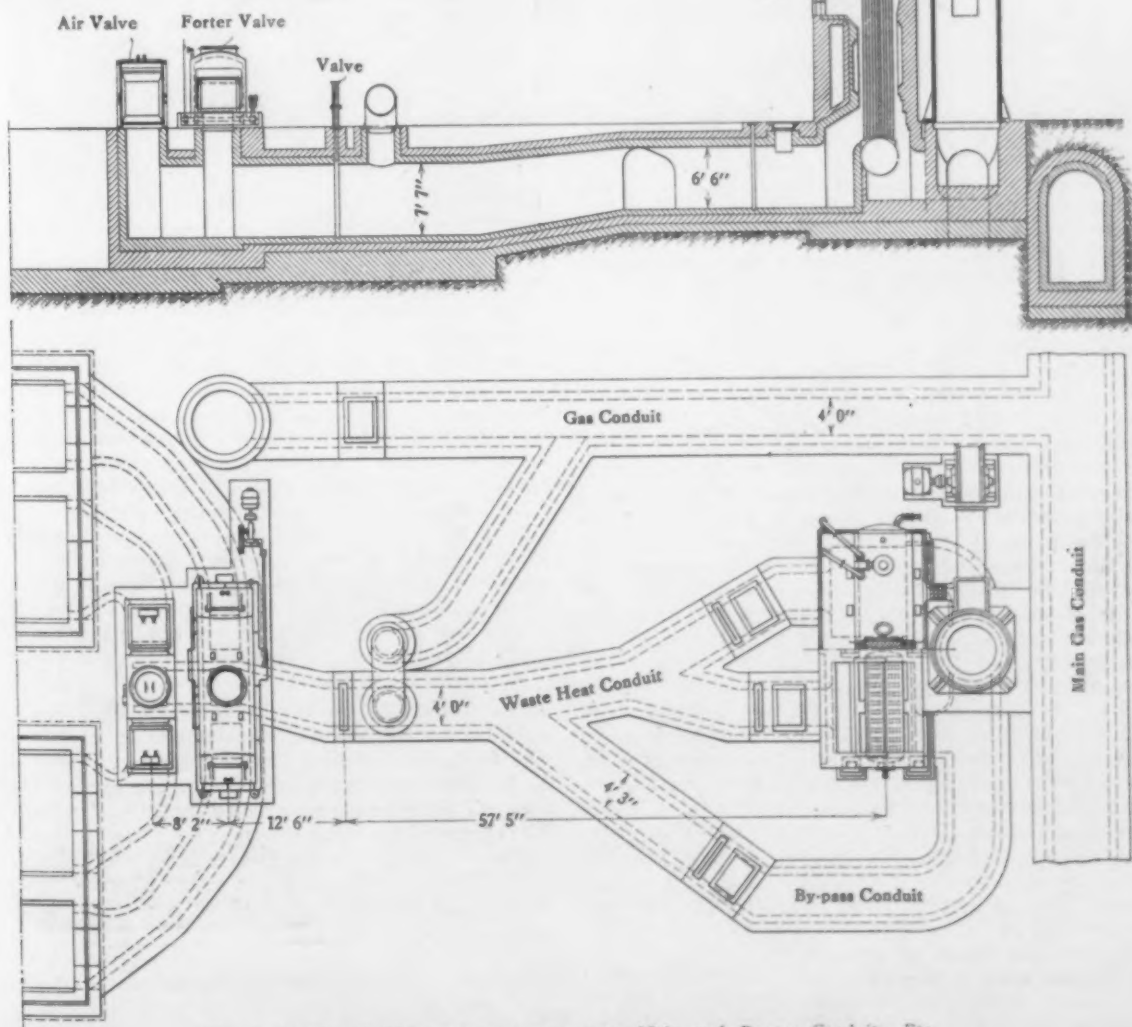


Fig. 3—Details of Waste Heat Arrangements—Main and By-pass Conduits, Etc.

is lined through with firebrick, although this would otherwise be unnecessary. The sheds seen near the boilers in Fig. 2 contain the feed pumps, fans, motors, etc. The case of the breakdown of the motors or fans is also provided for, the necessary suction being then produced by a steam blast. In this way all possible troubles are taken care of. The steam produced is used in the gas producers, the excess being taken to the basic Bessemer mill and the rolling mills, and the steam is therefore only furnished at 120 lb. pressure, although the boilers can give 180 lb.

The boilers chosen were the Garbe patent because they fitted best into the available space. Whether other boilers would give better results should not be considered at this time. The volume of the waste gases and therefore the power required in the suction plant, apart from the temperature and the coal burned, depends on the excess of air present. The entrance of air through loose brick work, etc., is therefore to be avoided as much as possible, and under certain conditions it may be advisable to replace the ordinary loose-fitting butterfly valves for the air with tightly closing reversing arrangements such as are used for the gas. The entrance of air through the brick work around the boilers cannot apparently be prevented even with the greatest care, it being brought about by the porosity of the brick work. The results obtained are given in detailed tables, from the first five of which Table 1 has been compiled.

Table 1—Average Results

Time	Furnaces	Size, tons	Duration of test, hr.	Entering gases, deg. C.	Gases in chimney, deg. C.	Steel produced, tons	Coal per ton steel, lb.	Normal steam
Jan., '12.....	1	30	24	451.4	.....	133.9	494	See below
Feb., '12.....	1	30	24	501.5	.....	136.7	483	
Aug., '12.....	2	30	24	612.7	304.7	150.1	466	
Sept., '12.....	1	40	24	623.1	318.8	176.4	472	
Sept., '12.....	3	50	24	657.4	341.5	217.1	472	
Aug., '12.....	4	50	24	707.6	352.4	199.51	516	

Date	Fees.	Lb. per sq. ft. heating surface	Lb. per metric ton coal	Lb. per metric ton steel	Remarks
Jan., '12.....	1	0.4513	1,555	348	After 176 heats
Feb., '12.....	1	0.7255	2,498	549	After 284 heats
Aug., '12.....	2	1.0189	3,289	498	After 503 heats
Sept., '12.....	1	1.3573	3,644	796	After 715 heats
Sept., '12.....	3	1.2800	3,564	765	After 397 heats
Aug., '12.....	4	1.4386	4,106	974	After 160 heats

Four more tables are given showing the steam test made during separate heats from furnaces 1, 3 and 4. These results are brought together in Table 2, from which it is seen that about 40 per cent. of the heat in the waste gases is used, but that about 60 per cent. is still unfortunately lost with the present plant. In other words, the 30 per cent. loss of the heat developed in the furnace operation is reduced to about 18 per cent.

Table 2

Fees.	Heat	Temp. of gases entering boilers	Temp. of gases leaving boilers	Heat taken up by boilers	Loss in waste gases leaving boilers	Loss by radiation, conduction, etc.
4.....	451	719 C.	349 C.	44.2%	55.6%	0.2%
4.....	459	686	346	44.9	54.0	1.1
1.....	674	623	310	43.8	53.4	2.8
3.....	708	604	348	39.2	60.6	0.2

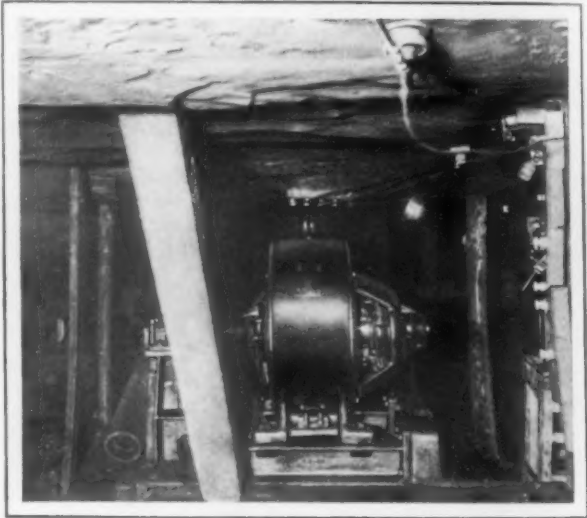
The next question is that of economy, and of course it must be remembered that the business of the open hearth is not the raising of as much steam as possible but is much more the production of the largest possible tonnage of steel with the lowest possible coal consumption and temperature of the waste gases. Cost calculations are given for furnaces 1, 2 and 4 with waste gas temperatures at 451, 501.5, 612, 623 and 640.3 deg. C. The cost of the plant, minus the cost of the chimney which would otherwise be necessary, is given as \$5,476 for the 30-ton furnace and \$6,428 for the 50-ton furnace. The cost of power is taken as 0.595c. per kw hr. and the value of the steam at 47.6c. per ton. With waste gas at 451 deg. C. there is a loss per ton of steel produced; when it is 501.5 deg. C. the gain is only 1.9c. per ton. The gain increases with rising temperature. With 612 deg. C. it is 3.81c. per ton; with 623 deg. C. it is 6.66c. per ton, and with 640.3 deg. C. it is 8.33c. per ton. The basis taken is 250 working days per year. These results put in another way show that the yearly excess over the capital invested in the plant is 11.5 per cent., 26 per cent., 54.3 per cent. and 66.9 per cent, respectively, increasing with the waste gas temperatures and the size of the furnaces.

By the use of economizers it is calculated that the waste gases can be cooled down 40 or 50 deg. C. more, the amount of heat utilized being raised to 50 or 55 per cent. and the heat escaping by the chimney reduced to 45 or 50 per cent. The use of such economizers will scarcely increase the operating costs, because, although a little more resistance will be introduced, the cooling will reduce the volume of the gases to be moved, and the two will probably equalize each other. It must be remembered that this is only a first step in the utilization of the waste heat, and that further tests and work must be done to improve the results and reduce the loss.

G. B. W.

A Self-Starting Direct-Current Mine Motor

An improvement has recently been made by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., in the construction of its mine motors by which the direct-current units are self-starting. This improvement, of course, increases the value of the motors for mine work, as heretofore, while it has been possible under some conditions to start them from the powerhouse, most of the motors installed for driving pumps and fans in mines had to be started by hand. This made it necessary, if for any reason the power supply was temporarily interrupted, for the attendants to visit each motor and start it. With the new self-starting direct-current motors this inconvenience



A New Self-Starting Direct-Current Electric Motor for Driving Mine Pumps and Fans Developed by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

is done away with. When the power fails the motors, of course, stop, but as soon as the current comes on again the motors start automatically. In addition, starting boxes are eliminated and the wiring is simple. It is pointed out that all these motors require is an occasional inspection; otherwise, they can be left entirely to themselves.

The electrical characteristics of the self-starting motor differ but little from those of the usual type, the only alteration being in the use of a heavier compounding winding, which reduces the flow of current when starting. In the mechanical construction of the motor there is no change. These units are built in sizes up to 20 hp. for the voltages usually employed in mine work, and can be supplied for all kinds of pump and fan service.

The Portland Iron Works, Portland, Ore., has placed an order for two 1000-hp. triple-expansion, angle type engines with the American Engine Company, Bound Brook, N. J. These engines, which are for use on two Government dredges being constructed by the Portland Iron Works, are of the twin-angle type with two horizontal and two vertical cylinders, the former being the high-pressure ones. This type of engine was selected because by reason of its good balance it operates at a comparatively high speed, thus permitting a more advantageous design of centrifugal dredge pump to which it is directly connected to be used. Another advantage is that the angle arrangement also eliminates vibration and pounding and reduces the amount of floor space required.

Test of a High Vacuum Condenser

Acceptance Trial of a Large Wheeler Unit Installed in a Steel Plant

A large high vacuum condenser of the dry tube base design built by the Wheeler Condenser & Engineering Company, Carteret, N. J., has been installed at the South Works of the Illinois Steel Company, South Chicago, Ill., in connection with a 7000-kw. Curtis mixed-pressure turbo-generating unit. Low-pressure steam is supplied by three 2000-kw. compound reciprocating engines, which discharge into a header about 100 ft. long. In addition to this supply of steam, the exhaust from blast furnace blowing engines and auxiliaries is used, which renders 200,000 to 250,000 lb. of steam available per hour. In case of a deficiency of the supply of exhaust steam, high-pressure steam is employed to carry the load. In the design of the condenser, a view of which is given in Fig. 1, the following vacuums were guaranteed with a cooling water temperature of 70 deg. F., and not more than 34,000 gal. of water per minute: Vacuum 28.3 in., 210,000 lb. of steam per hour; 28.5 in., 185,000 lb.; 28.6 in., 150,000 lb.; 28.7 in., 120,000 lb.; 28.9 in., 70,000 lb.

The arrangement of the condenser and auxiliaries is

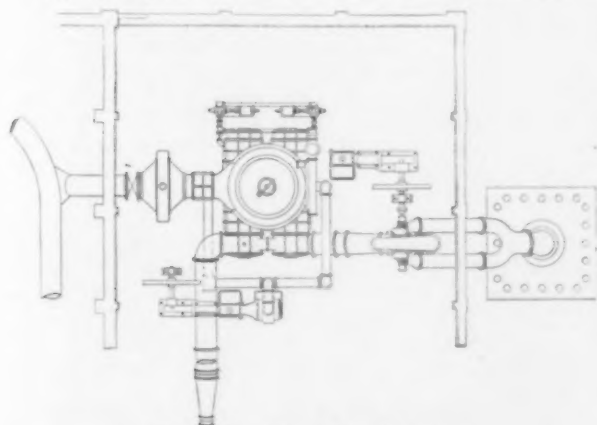


Fig. 2—Plan View of the Apparatus

shown in Figs. 2 and 3, which are a plan view and an elevation respectively. The condenser tube surface is arranged in two sets of banks on either side of the center line with dry plates at several elevations on each side draining outward toward the shell. These divide the tube surface into a number of compartments designed to give an efficient and even distribution of the steam to all of the surface. There are about 6000 1-in. tubes in the con-

denser, making in all about 25,000 sq. ft. of surface. The circulating water makes two passes through the tubes, entering at one end and passing through the lower bank of tubes on both sides of the center and returning through the top bank to the discharge. The circulating water is drawn from Lake Michigan through an intake tunnel 150 ft. long and is discharged to a sewer. The circulating pump is a Wheeler 36-in. double suction volute pump,

operating at a speed of from 100 to 135 r.p.m. This pump is driven by a 20 x 24 in. Cooper Corliss engine. The dry air pump is a 14 x 36 in. Wheeler tandem rotative dry vacuum pump and there are two 5-in. centrifugal hotwell pumps installed which are driven by 24-hp. steam turbines.

To check the guaranteed values, the steam engineering department of the Illinois Steel Company made tests in July with the inlet circulating water at 73.4 to 73.7 deg. F. Remarkably high vacuums were obtained with cooling water at a temperature of 73.5 deg. F. For example, with the water admitted at this temperature, steam at the rate of 171,000 lb. per hour was condensed at a vacuum of 28.473 in., corresponding to 92.5 deg. F., and

the outgoing water was at 84.6 deg., a rise of 11.1 deg., and the hotwell temperature was 87.7 deg. The coefficient of heat transmission figured out at 532 B.t.u. per square foot of surface per hour per degree temperature difference. Other results worthy of mention were a small difference in temperature between the discharged condensing water and the steam, from 4 to 10 deg.; a high hotwell temperature, which was only from 2 to 6 deg. below the temperature of the steam, and the large coefficient of heat transmission, 550 B.t.u. per square foot per hour per degree

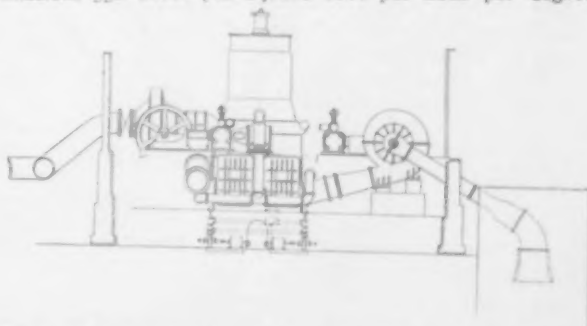


Fig. 3—Elevation Showing the Arrangement of the Condenser and Its Auxiliaries

difference in temperature, with a load of 210,000 lb. of steam per hour. This was the maximum load on the condenser, but it is claimed that from the results obtained it would have been possible to carry a load of 250,000 lb. of steam per hour, with a 28-in. vacuum and a cooling water temperature of 70 deg. F.

High Cost of Living Is High Cost of Labor

Jack Cade's Political Economy in Modern Guise—No Cure for Present Conditions Except in Increasing Individual Output

BY "MANAGER"

Every thoughtful observer of business and political conditions realizes that beneath the present prosperity there is an undercurrent of uncertainty due to the feeling that, apart from a change in political administration, all is not well with underlying conditions, though but few have been willing to come out in the open and declare the fundamental cause, as I am compelled to see it.

Business and politics are more inextricably mixed than ever before in our history; and while the pages of *The Iron Age* are no place for a partisan discussion, so many subjects have been covered by the platforms of the various political parties that it is impossible to deal with national questions without giving one's views a political slant. But I have no wish to make this analysis political. There are things that we can all agree with in each of the political platforms.

Those who discuss labor and conditions of labor ordinarily may be divided into three classes.

First, the growing group of persons, many of them sincere and honest, who may be denoted as uplifters, whose better emotions are profoundly stirred by the misery and sorrow existing in the world, and who devote their efforts, with more or less singleness of purpose, to the betterment of these conditions.

Second, labor leaders, who are paid attorneys for those elements of the population who have styled themselves the "workers," though they intend that appellation to exclude many others who work as hard as they, or much harder, and whose work is just as much of a necessity in producing the material requirements of our civilization. The attitude of this class is, frankly, that of taking all they can get, irrespective of where it comes from or who earns it.

Third, financiers or their satellites who express the views of capital and its desire for an adequate remuneration for its service to the community.

Operating Men and Economic Problems

There is a fourth class, much smaller numerically than either of the first two, probably smaller than the third of the above groups, whose views are seldom or never brought out in discussions of this kind. These are the operating men of modern industry. The poorest of them know only the necessity of paying as much as the lowest of their neighbors for a given class of labor. The best know, in addition to this, that beyond certain limits cheap labor, measured in cents per hour, produces a more expensive product than a dearer but more efficient labor. These also know that in order for labor to be employed by the particular business with which they are concerned, it must pay an adequate return on the capital invested in it. They know something of the difficulties of the financial side, realizing that no more can be taken out of the business than is put into it; that no matter how solvent it may be, if it cannot raise the actual cash to meet the payroll, the concern they represent goes into bankruptcy. Most of them have started, if not in the ranks, at least so close to them that they know "how the other half lives" as well as or better than the uplifters, who claim to make that their business.

Why these operating men should be so seldom heard from in discussions on subjects of such vital importance to the nation, I do not know, unless disgust with the ignorance and folly generally displayed in such matters keeps them silent. It is as one of these operating men that I desire to be heard, one who has enjoyed opportunities perhaps wider than common for seeing at least two sides of these great questions, and in the search for the answer has gone over certain considerations which he believes should be emphasized.

The Earlier and Later Jack Cade School

In Shakespeare's Henry VI we read of the first progressive, Jack Cade, who started an insurrection in Eng-

land on a platform of which the first plank was: "There shall be sold seven half-penny loaves for a penny. Every three-hoop pot shall henceforth have ten hoops." But the times were not ripe for such advanced views; his insurrection was promptly suppressed and he himself was slain for promulgating them. Now he would undoubtedly receive great public esteem and probably high political office, because underlying our present business and political conditions is the proposal that from every three-pint pot we shall get ten pints.

To the uplifter it makes no difference whether a certain business can be carried on and meet its fixed charges with a higher rate of wages than it is now paying; he has within himself some God-given means of setting a "minimum wage" and this must be paid by every industry, at least until such time as the sheriff shall close its doors.

We hear everywhere groans of distress concerning the high cost of living, yet few have the fortitude to look the situation in the face and see its cause. Ten years ago there was a great coal strike. The operators claimed they could pay no more. The miners declared that they must have more. During the deadlock no coal was mined; the public suffered. When the strike was about broken a high political power injected itself, almost by force of arms, into the settlement of the question and evolved at one stroke of a master mind the doctrine which has since ridden around the world: "Charge it up to the consumer." The coal strike was settled on that basis. Virtually the operators, representing capital, and labor made a bargain that each of them should have, if not all, at least a good part of what they wanted and that the public must pay for it. This was so easy a method of settling strikes that many others soon followed in the path thus blazed. And so it went all around the circle until shortly every one, except a few unfortunate salaried men, had more wages or more income. Presently, however, they began to realize that with the greater income they were no better off than they had been before. In fact, they were rather worse off than before, and to this day a great majority, even of our thinking population, does not know why. The reason is not far to seek. Not only has labor insisted on a greater hourly return for its service; it has stipulated, at almost every turn of the road, working conditions which mean less labor turned out per hour.

Larger Shares Called for Yet Less to Divide

The imports and exports of this country are a bagatelle as compared with its domestic commerce. Within narrow limits, therefore, we make what we use and use what we make. It ought not to be necessary in this age to say that all there is to divide is what is produced, and yet few people seem to realize it.

The obvious result of this simple fact is that the more each one produces the more there is to divide. We have been engaged in a systematic campaign for ten years past, so to alter the conditions of labor that each should produce as little as possible. The effort has been almost universal and has been crowned with success. If statistics concerned themselves with the amount produced by each worker in units of actual labor and we could thus compare the units of labor per man per day in 1902 with 1912, the shrinkage would appall the thinking members of the community.

The fact which is so familiar to every operating man, that the deliberate end and aim of organized labor is to have each man do as little as possible so that there shall be work for as many as possible, is unknown to the great majority of the thinking people in this country, and even if known, many well-meaning persons justify it on account of the new doctrine which has taken shape rapidly in very recent years that in the past men were worked to exhaustion and that they are justified in doing anything to alter those conditions. The utter lack of truth in this idea as

regards those occupations in which men only are employed, is known to any operating man whose experience goes back into the supposed dark ages previous to 1902.

The Farmer's Costs Rising Also

It might be claimed that the high cost of living was due mainly to the high selling price of farm products, and, to the unthinking it might seem that these were not affected by the conditions which I have outlined above, but nothing could be further from the truth. The farm is, so to speak, the residuary legatee of all these conditions and receives a portion of the consequences of them all. When wages in trades were two-thirds what they are and a real apprenticeship at much lower wages was required as a prerequisite to practicing that trade, young men were not tempted by industrial life. They saw their future more clearly before them on the farm, so they stayed by it and the farmer had labor in plenty. He could cultivate his land to the full.

Now, all this is changed. It is a matter of statistics that there are fewer farmers now than there were ten years ago in more than one of the great central States where farming is the principal industry. Many reasons are given for this condition. The real one is that the young men who would by now have been farmers have taken up trades and gone to the cities, whose high wages and easily accessible amusements appeal to them more than life on the farm. In some of the most fertile sections of this country, noted for their fertility, their climate and every advantage which nature can bestow upon a farming country, you can find farms in plenty where once wheat and corn were raised as the staple crops, but now the lands are in grass. You ask the owners why. "I am growing old; the labor has all left the community; I can get no one to help me. I am able to attend to a few cattle, which I feed on these pastures and sell for beef. I cannot get the help necessary for dairying or grain or truck." If there are any who disbelieve these statements, let them examine the conditions in the agricultural districts for themselves. With population increasing, virgin soil which yields heavy crops with minimum fertilization all exhausted, and a diminishing farming population in the eastern and central portion of the country, what other results than the high cost of food products could be expected?

If this were a true and natural adjustment of conditions no one could complain, but as a matter of fact the adjustment is not a natural one.

The Labor Trust in the Building Trades

The power of organized labor is exerted in two great classes of industry in such a way that competition in labor is eliminated more perfectly than was ever permitted to any so-called trust in the history of the world. Through this means they have extorted for themselves wages and conditions that set a wholly artificial standard. These two great lines of industry are:

First, the public, or semi-public service corporations, including first of all the railroads with their dependencies, such as locomotive and car repair shops; street car lines, public lighting companies and the like.

Second, the building trades in cities. These are the centers from which radiates the union influence.

We will consider first the reasons why the building trades should be the centers of union influence. It is, briefly, because building, as far as the owners of the buildings are concerned, is not, in most instances, a business in which they expect to be engaged all their lives. A man may in his life build one house, or a single group of men will build a great factory, office building or hotel. They are not interested in the principle of freedom of contract and its maintenance, so much as they are in finishing that building, because when it is done they expect never again to be bothered with building another. Consequently when the union comes to them bringing such and such an unreasonable exaction or demand in one hand and the threat of a strike in the other, they say, "This is an outrage, but when we get done with this building we shall be done with you and you may go hang, so we will give in to you this once." If a contractor, who makes a lifework of building, is doing the work, it makes but little difference, because the owner brings pressure to bear on one side of him while the labor union brings it to bear on the other, and he is forced to yield to their joint demand, even

though he make the owner reimburse him financially for his loss.

This situation has been met in recent years, especially in the larger buildings, by associations of building contractors united for mutual defense against the aggressions of the labor unions; but how strongly entrenched the latter were and how determined they were to win at any cost, is best shown by the recent legal testimony at Indianapolis, and that earlier in the year at Los Angeles. As the building trades are each more or less united with kindred trades outside of the building business, the influence of these conditions in bringing about the lower rate of production by all has been enormous, and the small amount of work done per man per hour in those trades would astound the public if it knew the facts.

Labor Control in Public Service Corporations

Turning now to the public service corporations, we find the same state of affairs still more exaggerated. The public, through its government, has given to the public service corporations the powers which enable them to exist, and they demand with some reason that their convenience must not be sacrificed by warfare between the capital and labor which jointly operate a given utility. In consequence, when a question comes into dispute which is likely to interrupt the service of the public utility, the public says: "You must not stop our business or interfere with our convenience. Give the poor fellows what they ask." Generally it adds, irrespective of the facts, "You are perfectly well able to do so."

But back of this lies a far more potent cause for the truckling of the owner to the employee of the public service corporations. The vast amount of capital required causes these corporations in almost all cases to be publicly owned, with listing of their shares on the exchanges and constant trading in them. Those in control of the properties naturally object to seeing the prices of their shares hammered down by the decreased earning and uncertainty that go with a strike. They are in many cases not sufficiently sure of control for a long enough time in the future to assure them that in the long run their earnings will be higher by resisting the unreasonable demands of their employees. Consequently orders are sent down the line to the operating men that the difficulty must be settled.

As the difficulty is, in nine cases out of ten, some demand for change in conditions or wages or both, which increases the operating cost, the unfortunate manager is forced to make the best terms that he can for himself, or submit to a board of arbitration, which, in nine cases out of ten, will not pass on the fundamental justice of the demand, but will give the employees at least part of what they ask for. In a short time they formulate a new set of demands and get part of these in the same way.

If the general manager of the railroad allows a strike to occur, without the sanction of his board of directors, he must win it (if he wins it at all) with but little or no support from them, and if he loses, he at once becomes a scapegoat for having brought on the trouble and is either unceremoniously kicked out, or dropped to a position of insignificance, which is tantamount to the same thing, and frequently he is unable to get such a position again. If any one doubts that this is the correct statement of the conditions, let him look up the records and he will find six cases such as I have outlined for every one of the opposite kind. In addition to this the foremen and sometimes superintendents are frequently promoted from the ranks, which it is proper and right that they should be, but for that reason they know so well that they cannot hold their positions unless they make themselves solid with the unions, and their hands are so tied in disciplinary matters that the keen edge of their desire to make a showing in the company's interest is soon dulled. They bite their lips at extravagant conditions which they cannot help, and in many cases, like most men under similar circumstances, they come finally to acquiesce in the conditions.

Thus, for many years, all heart was taken out of resistance to the demands of unions on behalf of those who should represent the owners of the property.

Now, however, in regard to the railroads we are facing a different situation. It was the uniform practice for many years to give way to the demands of employees and then "charge it up to the consumer" in increased freight rates.

This resulted in increased earnings and, shortly, in another series of demands on the part of employees for their share of this increase. Wages, operating cost and freight rates pursued one another upwards around a spiral stairway. After a time, however, the great commercial interests of the country began to protest against further increases in freight rates. A great contest before the Interstate Commerce Commission was held between the railroads, demanding higher rates to meet their increased operating charges, and the shippers, protesting that their business would stand no further freight charges. The shippers won. In freight rates, therefore, there will, in all probability, be no further advances, at least until a reasonable period has rolled around in which the railroads can appeal again.

This, however, has not for a moment abated the desire of railroad employees for periodic increases in their wages, irrespective of business conditions, freight rates, or earnings.

We have recently seen an arbitration between the representatives of the railroads, of a great railroad labor organization and of the public in the richest and most thickly settled division of the United States. The result not being all that the labor organizations had asked for, they announced that it would, or might soon, become necessary for them to demand that the Interstate Commerce Commission allow increased freight rates so that the railroads could pay the wages which they demanded and still make income and expenses meet. The arbitration board which settled the question was so far imbued with the modern spirit of taking ten pints from a three pint pot that it confessed its inability to determine a correct basis on which the question should be settled. It contented itself with the statement that the wages should be high and give the men a part of the increase that they asked for.

What has become of the law of supply and demand? Why could they not have said to the employees: "Your employers are not fairly able to pay you any more under present conditions. The test of whether you are underpaid or not is whether the employers can fill your places freely with men as competent as you at the wages you are now getting." Did the arbitration board say this? No, apparently they never even thought it.

The High Scale of Railroad Wages

To the man in the street, who sees the harmless looking schedules of wages agreed upon, the fact does not shine forth that these men, making this implied threat against the country at large, are earning on an average from \$125 to \$225 per month and working on an average about 10 hours a day. He does not know that these men require less skill than the driver of an automobile; that they may be promoted to these highly paid positions in two or three years from raw and uneducated boys, and frequently reach them in five or six. As to whether their places can be filled or not: I not long ago asked the superintendent of a large division of one of our great railroad systems how long it would take him to replace all his engineers with men as competent as they at half their wages, if he had a free hand and open labor market, and he answered, "It would take me a very short time; I would not delay a train in making the change." No one who knows the conditions doubts for a moment that these men, with their great claims for responsibility and the romance in which foolish writers have enveloped them, require less training, less skill and less natural ability than a good mechanic, who must be satisfied, in many cases, with one-third of their wages. If their contracts with the railroads did not put them in an impregnable position there would be nothing to prevent their being replaced by men as good or better at wages far lower than they are now receiving.

For a long time the man in the street looked on these high wages with approval, but if he realized that they were paid by inflated freight rates, which were added to the cost of the goods he bought, would he be so complacent at seeing another earn three or four times the amount with which he must be satisfied, without superior qualifications or ability? It would seem that he still is satisfied; but does he know the facts? I doubt it.

Not long ago I was thrown in contact with a minister, well educated, who had lived both in the East and in the Central West, and who desired to do justice to all, as

far as he could see the right. He said something about the labor question which showed there were many sides of it of which he had never had a glimpse, so I told him some facts of my own knowledge. I told him, for instance, that a certain road carrying iron ore from the Lake Superior ranges to upper lake ports had at one of its shipping ports a short, steep grade against the traffic; that it was limited by this grade to 65 cars per train, whereas on other portions of the haul it could handle 100 cars per train. When I asked an official of the road why they did not double-head this grade, as it was almost within their yard limits, and the traffic density very great, averaging more than one loaded train per hour during shipping season, he answered: "Our contract with our men does not allow us to double-head any train of more than 25 cars over any grade. We could probably cut our operating cost on this run 25 per cent. if we could double-head that grade."

This and many other facts of this kind known to every operating man I poured into his receptive but astounded mind. They made a deep impression on him and he thanked me for the information. I believe that a systematic and extended campaign of education would have changed his whole point of view in a few months.

High Living Cost Is High Labor Cost

Consider the influence wielded by the clergy of this country as a whole; think which side most of them have favored in all the labor controversies of which we know; consider that they are probably all as honest of purpose and many as broadminded as the one just mentioned. Can any sane man believe that these men would take the stand they almost universally do take, if they knew the facts and were made to realize, as every operating man does, that the high cost of living is the high cost of labor, not only, and not even principally, in high wages but in limitations of output and burdensome operating conditions, designed to force the employment of the greatest possible number of men?

If labor were as efficient as it was 15 years ago and the surplus released from industry by this increased efficiency were back on the farms, which it would never have left save for this artificial labor scarcity, does any one believe that the cost of food would be where it is today?

Steps in the Economic Descent

This subject is too vast to be adequately discussed in a publication such as this, and an adequate discussion would weary the average reader so that he would soon quit it. Let us consider then only the skeleton of facts which I have so inadequately stated, and see if we can realize the answer.

First, there has been a tacit agreement on the part of many to overlook the fundamental law that in the long run and on the average we cannot have more than we produce.

Second, having ignored this law we have not only increased wages, but have tacitly, if not openly, encouraged a tremendous reduction in the efficiency of labor, so that in the judgment of many it requires two dollars now to buy what was a dollar's worth of labor in the middle nineties.

Of this increase perhaps half is a direct increase in hourly wages; the other half is a deliberate diminution of hourly output. We have all engaged in a great conspiracy to produce less, in the hope that we should be able to divide more.

Third, this has resulted in continued increases in the price of commodities, with consequent increases in the cost of living and then in the price of wages to offset the increased cost of living, which in turn was reflected in a further increase in the cost of commodities, and so on without limit.

Fourth, the artificial wage scales enforced against the public at large, owing to its importance in protecting itself from unionized trades, combined with the easy conditions of labor similarly extorted, have resulted in withdrawing from the farms much of their natural supply of labor and causing this portion of the population to become consumers instead of producers of surplus food stuffs.

Fifth, this labor is not needed in industry except owing to the deliberate inefficiency of industrial labor, and therefore should never have been withdrawn from the farm.

Sixth, for all this the man in the street must pay. If

he is a wage earner he is no better off because his scale of expenses has increased as rapidly as his wages. If he belongs to the commercial or salaried portion of the community he is infinitely worse off, because he has to bear an undue proportion of this increased cost of inefficiency.

Seventh, the man in the street has not thought deeply enough to realize the extent to which he is paying for these frightful conditions.

The Railroads' Problem

These conditions have their consequences which spread in ever-widening circles. For instance, a great portion of the community is dependent on selling its output to the railroads; but the railroads, with their net earnings barely equal to operating expenses, fixed charges and dividends, cannot buy the equipment of which they have starved themselves for five years past in anything like the quantity that the far-sighted know to be required.

If, on the other hand, they cut off dividends and divert the money which should go for that purpose into equipment or permanent betterment of the kind that almost all of them need, their credit is destroyed and they can raise no money for these very betterments. They are not allowed to increase their income; their operating expenses, through inefficiency and higher wages, are constantly increasing. Either they must become utterly inadequate to the needs of the community or they must have more net revenue. This can only be obtained in one of two ways: First, increasing their rates, which, in the long run, is no solution at all because in a short time organized labor would have taken it all from them again. Second, decreasing their operating expenses. This means either reduction in wages or the elimination of the wasteful operating conditions enforced by the railroad unions, like that cited above.

In 1907 the same high political power which five years earlier had invented the slogan "Charge it up to the consumer," invented a second: "The returns from labor are sacred and must not be touched. The returns from capital may go hang." And the Interstate Commerce Commission was officially ordered to prepare a club with which the railroads could be attacked if, in the face of a shrinkage of their gross revenue to half its former size and a vast quantity of unemployed labor where formerly had been a chronic shortage, they took advantage of the old-fashioned law of supply and demand and reduced their operating expenses by reducing the earnings of labor by only a small fraction of the reduction in the earnings of capital.

High Labor Cost and Foreign Trade

Others, for reasons sufficient to themselves, took up this slogan and declared (with how much sincerity we cannot tell): "The earnings of labor are sacred. They have been on an inflated basis for years, but we shall not put them down." Much of this spirit permeated the country as a whole. Instead of lowering wages and keeping men at work, those plants which could not run on the inflated wage basis closed down and the surplus of labor left thereby flowed back to Europe like a great ebb-tide.

With the great moral effect of this declaration upon them, the hands of employers were tied and it was impossible for them to make reductions in the cost of their product, such as they had made in the middle nineties. If the country had been ringed about with a Chinese wall, this would have made little difference; but such was not the case, and those whose recollection goes back so far will remember that the first signs of returning prosperity in the later nineties came when we found that by competition we had reduced our costs and our selling prices to such a point as to make our goods attractive in European markets, and a great export trade sprang up almost over night to absorb our surplus. This was killed by the increase in cost of production, which came with renewed prosperity at the end of that decade and endured through most of the next. Much of it has never been recovered.

Not our high wages alone have caused this condition, but more particularly the high cost due to inefficiency. We produce so little per individual (when we take account of the increased means of production) that the labor cost of a unit of product is prohibitive and foreign markets will not absorb our surplus, except on a price basis that nets us a loss.

These things are the reasons for that underlying feeling of uncertainty and unsoundness which today haunt all those who consider the future. Our railroads are kept too poor to buy, too poor to borrow. Our surplus cannot get into foreign markets because too much labor is required in its production.

At present we are enjoying a spurt, due perhaps to necessary buying by the railroads which they could no longer defer and which they had to finance as best they could in spite of high interest rates, but until our production per man per day is higher by far than it is today we must be industrially inferior to other nations, which do not try to take ten pints from a three-pint pot.

Show the Consumer His Interest

Granting, for the sake of argument, that I have indicated some of the causes of present conditions, the question naturally arises. Of what use is it unless we can find the remedy?

The remedy is not far to seek. The unionized trades, which are the very heart of this determined attempt to get more than they give, to take more than they earn, comprise only about 2,000,000 of the wage earners of the United States, or 10 per cent. of a total of something like 20,000,000. If the other 90 per cent. can be made to see that it is they who pay at every turn for these conditions; that their opportunities are cut off on one side and their living expenses raised on the other by this close corporation, which uses anything from a dynamite bomb to a threat of starving the cities to enforce its will, how long will they supply the passive, if not the active, support which has enabled these conditions to be brought about?

We must teach the man in the street; we must carry on a campaign which will reach the farmer; show him in dollars and cents what it costs him to have these conditions prevail; show the great mass of people everywhere that they are being, perhaps not deliberately but none the less surely, exploited by as bowless a trust as ever has been prosecuted under the law.

Much can be done with publicity. If financiers could be made to realize how much they had at stake, how unthinkingly they had played into the hands of those who extorted their earnings from them, it should be easy to raise \$400,000 a year for a five-year campaign of education. It is not sufficient to buy moribund magazines and galvanize them into life with money, under the supervision of literary "hacks." A man of the type that has earned fame as the secretary of manufacturers' associations, who knows the facts first hand and knows how to get educational value out of them, must be found and put in charge of a magazine of distinct literary merit, such, for instance, as one which has constituted itself the weekly organ of progressiveness and has a circulation of almost two million a week. It is not necessary to make arguments if you have the facts and marshal them aright. Find the man who can choose his facts and confirm them and who can get them into circulation in a genuine magazine. See that a copy of this magazine gets into the hands of every minister in the United States. Carry on a campaign among the ministers to present the facts, not necessarily of political economy, but of common sense in a logical way. Give them chapter and verse for the existing conditions in the industrial world. Trust them to make the application. At the end of a year or two the railroads could go to their employees and say: "We must reduce our operating expenses; you have been making demands of us, now we must make some demands of you. We do not wish to cut your wages except as a last resort, but you must eliminate many of these intolerable conditions which have increased our operating expenses almost to the point of bankruptcy. To show you that we are right, we will submit the matter to arbitration and the arbitration board shall contain representatives of yours, of ours and of the great public."

If such a campaign were carried on aright there can be little doubt that many of these intolerable conditions could be removed by the pressure of public opinion, whereas, now in the condition of blind ignorance prevailing on the part of the public, but little support for such a movement could be found and such reforms could only be introduced after a long and expensive conflict, if at all.

Above all, let the financier take the operating man

S. DIESCHER & SONS.

Mechanical and Civil Engineers.

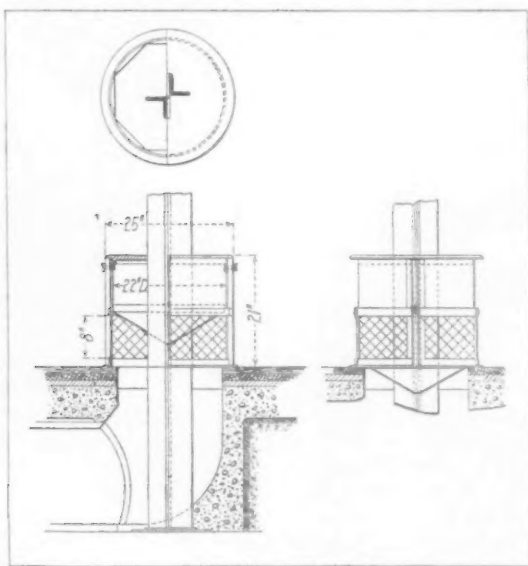
PITTSBURGH, PA.

into his councils and thereby inform himself as to the effect on costs of the "compromises" which he now so cavalierly orders and which always have one eventual outcome.

By following such a course, in a few years it would be impossible for a blatant lawyer to make the public believe that if the railroads of the country were losing \$1,000,000 a day through inefficiency, it was through the indifference or carelessness of the owners that they were doing so. The public would then know that while this stupendous figure was probably too small to represent the eventual loss to the community due to these conditions, its cause lay in a different direction and must be removed by no more complicated a process than forcing each worker to give somewhere near a dollar's worth of labor for a dollar; by destroying the hideous notion that there would be an abundance to divide for all, if only each one could be persuaded to produce the smallest possible amount.

Floor Air Inlets in Ford Motor Plant

In one of the new portions of the works of the Ford Motor Company, in Detroit, the shop is heated by means of fresh air distributed by means of underground ducts from a fan and heating chamber. These underground ducts feed floor outlets at alternate columns of the building, and the accompanying sketch has been reproduced to



Details of Fresh-Air Floor Inlets, Ford Motor Company

give some idea of the floor inlet to the shop, which inlet is quite unusual. Some general facts concerning the heating system have already been given in the two comprehensive articles descriptive of the Ford plant printed in *The Iron Age* of June 6 and June 13, 1912.

As indicated in the drawing, the column occupies the center of the inlet, and the arrangement resulted in a sliding octagonal sleeve damper. The damper is designed with a conical deflecting bottom, and is secured to the angles forming slots by means of wing nuts and studs. The lower part of each inlet box is formed by a screen of No. 8 wire of $1\frac{1}{2}$ in. diamond mesh, which forms an opening for the air, and the upper half is a pocket of sheet metal, into which the damper may slide when open. The top of the box is of cast iron and of substantial construction, so these boxes may be used as shelves to support various articles in the shop.

The dampers are for use simply to adjust the flow of air through the inlets, and no means are provided for shutting them off temporarily, as is the case with the overhead systems ordinarily operated. The system is proportioned so that the velocity at the outlets will not exceed 500 ft. per minute. This velocity, it has been found, is not objectionable to the men working around the air inlets.

It may be added with regard to the heating and ventilating system of the Ford motor car plant that the fans installed have an hourly capacity of no less than 33,000,000 cu. ft. of air, and that over 25 miles of pipe were used in

constructing the air heaters. The fans are of the conoidal type built by the Buffalo Forge Company.

A noteworthy feature of the plan is an arrangement for cooling the air in the summer by means of air washers. For this purpose, the apparatus built by the Carrier Air Conditioning Company for humidifying purposes was installed under a guarantee to deliver the air from the washer at not more than 1 deg. F. above the wet bulb temperature of the incoming air. The wet bulb temperature in Detroit seldom exceeds 75 deg. and in the hot weather is usually much lower. The object in specifying this degree was to insure comfortable working conditions even in the hottest weather, as the maximum temperature of the delivered air according to the guarantee must not exceed 76 deg. F. In the early summer of 1911, which was hot and dry, it is stated that at times it was 15 deg. cooler indoors than it was outdoors, and the building is practically all glass. Mr. Ford, it is added, felt sufficiently pleased with the results of the system applied to the office to spend about \$58,000 on installing this system, without cost of ducts, in the factory.

The installation was designed by the W. E. Wood Company, an engineering and construction company of Detroit. Edward Gray was the consulting engineer for the Ford Motor Company.

The S. K. F. Ball Bearings

The S. K. F. Ball Bearing Company, 50 Church street, New York, whose factory is at Gothenburg, Sweden, furnishes the following statement of the remarkable growth of a newcomer in the ball bearing industry:

Five years ago Gustave Wingquist, the inventor, began manufacturing S. K. F. ball bearings in a small machine shop. As soon as he placed his product on the market he met with high appreciation from engineers and manufacturers. In a short time he formed a company, the A. B. Svenska Kullagerfabriken, and had to build a factory to execute the orders he received. The next year he had to add to it to meet the enlarged demand. Every year since he has been obliged to add to the size of the factory till it is now an imposing structure, having grown to be one of Sweden's chief industrial properties. The business has doubled every year. Besides this factory in Gothenburg, Sweden, there are two others, one in England and one in France, both large and still growing. These factories are all working under high pressure. Branches have been opened throughout the world, and the use of S. K. F. ball bearings has extended accordingly.

The S. K. F. ball bearing is self-aligning, containing a double row of balls held in staggered arrangement in a single piece retainer. There are no auxiliary parts to effect the alignment, such as aligning cradles, etc. The alignment is produced by the balls rotating in an outer race, ground spherical to a radius struck from the centre of the bearing.

The Grand Rapids & North Western Railway Company has placed an order with the Great Lakes Engineering Works, Detroit, Mich., for three steel car ferry boats which, it is stated, will exceed any size in vessels of that type on the Great Lakes. Each will be 350 ft. long with 56 ft. beam. They will be of the twin screw type. Each will be equipped with two triple expansion engines and four Scotch boilers, will be constructed as an ice crusher with the view of being able to remain in service during the severest winter months, and will have four train tracks and capacity for carrying 30 freight cars. They will be operated on routes between Ludington, Mich., and Milwaukee and Manitowoc, Wis. The boats will be built at the Ecorse yards of the Great Lakes Engineering Works, Detroit.

The Trumbull Steel Company, Warren, Ohio, expects to have its new sheet and tin mill plant in operation by July 1. It will manufacture tin and terne plate, genuine charcoal iron ternes, black and galvanized sheets, flat and corrugated long terne sheets and formed roofing products.

The Sterling Emery Wheel Mfg. Company, Tiffin, Ohio, announces that its Chicago store is now in a new location in the New Machinery Hall, 30 North Clinton street. It will carry a large and complete stock of Sterling grinding wheels and grinding machinery.

Multiple-Spindle Woodworking Drilling Machine

A multiple-spindle woodworking drilling machine has been designed by Charles Weslow, East Orange, N. J., in which it is emphasized that no special castings or special material of any kind is used in its construction except the grooved pulleys. The main features of the machine are that the drilling heads can be adjusted to any desired point, while the distances from the center of the spindle to the edge of the table remain the same and the drills bore simultaneously, while the work which is clamped to the table is lifted by a foot lever fastened to the counter-balanced table.

The lower portion of the accompanying engraving shows how the angle piece *a* is held upon a pair of cold rolled slides spaced 18 in. apart and fastened by wooden screws to the plank *b* which measures $1\frac{1}{8} \times 6 \times 40$ in., the pieces *c* and *d* and *e* and *f* all being doweled together. The angle piece *a* is fastened to *f* by screws *g*, with the piece *h* sandwiched in between and all doweled together. The jibs *i* and *j* are fastened to *d* and *e* by the machine screws *k*. The pieces *f* and *h* with the angle piece *a* attached slide up and down between *c*, *d*, *e*, *i* and *j* which are all secured to the plank *b* that is bolted to the front side of two legs.

The drilling jig is made of a cold rolled strip, *l*, with two narrow pieces fastened to each side and as many tool steel drill guides *m* as are necessary. The strip shown in the center of the jig is the woodwork which is to be drilled and measures $7/32 \times 3/4 \times 28$ in., the last figure being the length. The table *n* is made of $1/4$ -in. cold rolled steel $5\frac{1}{2}$ in. wide and 43 in. long. The jig is fastened to the table by screws *o* and the table in turn is fastened to the angle-iron piece *a* by the screws *p*. In the center of the angle piece is fastened a rod connecting with a foot lever linked to a fixture or bracket on the floor. This construction is of simple design and is intended to raise the table to any point in its travel of about $2\frac{1}{2}$ in.

The drill head *q* is simply a cheap jeweler's polishing head which can be secured in the market at \$1.90 including the drill chuck. The pulley which comes with the head and which is shown between the journals is not used but is left in position to serve as a collar for the spindle, the upper pulley being secured to the spindle by a taper dowel pin. All of these pulleys are specially designed, as none can be secured in the market except in brass and of a much smaller size. The nut *r* which comes with the polishing head is not removed and the only change made in the head is in the edges of the base which are planed to fit in between the cold rolled strips *s* and *t*. These are fastened to a base of a 3-in. angle iron, *u*, which is 42 in. long. The strip *t* is grooved to fit over the upper edge of the angle iron since the long, narrow $7/16$ -in. slot

causes that section to weaken. Only a portion of the underside of the angle iron is planed to receive the cold rolled strip *s*. The angle iron *u* is fastened to a plank, *v*, by $5/16$ -in. lag screws and this plank in turn is fastened to the tongues on the upper end of the two front legs *w* by carriage bolts *x*. These legs are spaced 36 in. apart on the front of the machine and $12\frac{1}{2}$ in. on the side. Carriage bolts are employed to hold these members and all the other planks and braces not shown in position.

Two $4\frac{3}{8}$ -in. countershaft hangers are fastened to each end of the machine as shown. A 24-in. shaft with the necessary collars and a tight and loose pulley can be procured at \$3.60. The grooved pulley *z* has a hub so that a set screw can be conveniently employed to adjust the pulley in relation to the adjustments of the heads and a flat is filed along the entire shaft for the set screws to bear against. A $3/16$ -in. round belt drives the spindle at a speed of 60 r.p.m. Adjustable idler pulleys *a'* and *b'*

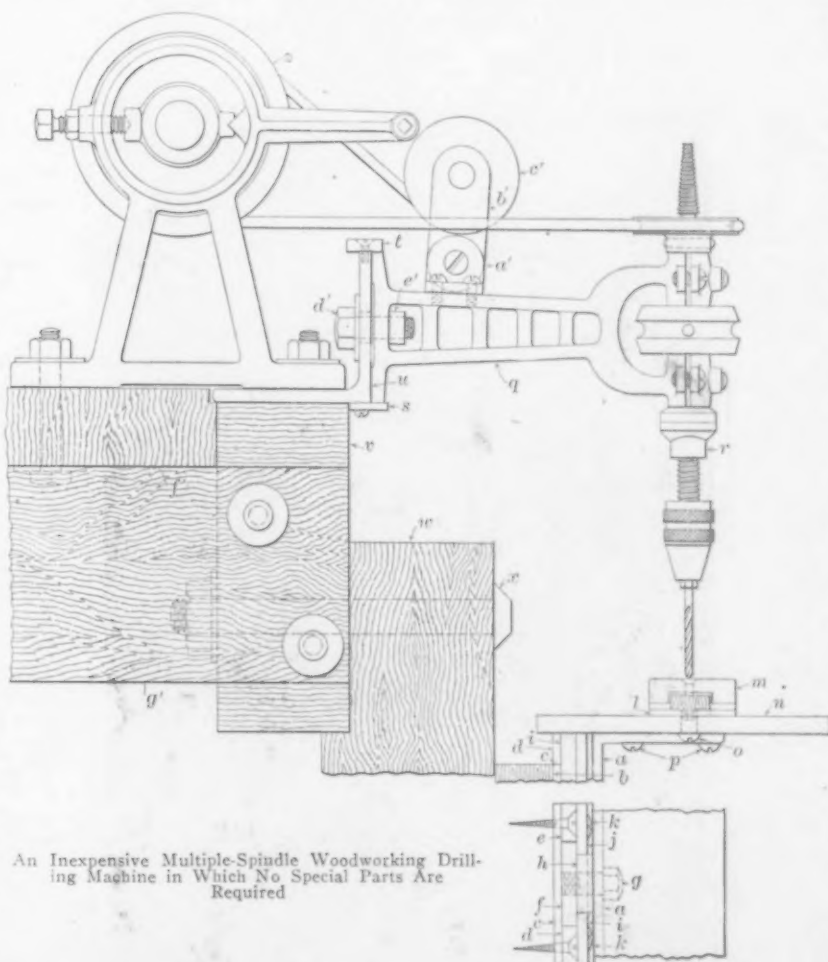
are secured to the frame of the head. The pulley *c'* revolves on a stud screwed into *b'*. The bolt *d'* holds the head securely against the angle iron *t*, a steel nut, *e'*, being provided for the bolt to work in. The distance from the center of the hanger to the floor is about 40 in., and the plank *f'* is fitted in between the planks *v* and upon the pieces *g'*, there being one at each end. If desired, as many as 12 spindles can be conveniently attached on each side.

A whole machine of this character has been built by a toolmaker at a cost of \$30. All the material, with the exception of the drilling heads, cost \$12, which makes the total cost of the

machine, including six drilling heads on each side, \$64.80. A local turning mill cut and machined the woodwork, which was assembled by the toolmaker.

The Hindley Gear Company is a new corporation, organized under the laws of Pennsylvania, with offices at 1105 Frankford avenue, Philadelphia. It will continue the designing and manufacturing of worm gearing of the Hindley type, which has been a branch of the business of the Otis Elevator Company for many years. The decision to place this business in the hands of a separate company has resulted from the greatly increased demand for such gears, particularly in the automobile trade, as the Hindley worm gear axles are being widely adopted for commercial trucks.

Authority has been given to the Salmon River Power Company by the Public Service Commission at Albany, N. Y., to issue \$882,000 in bonds to be used for the construction of three dykes, raising a dam and doing the development work at Orwell, N. Y., for the installation of hydraulic and electric equipment and the construction of transmission lines.



An Inexpensive Multiple-Spindle Woodworking Drilling Machine in Which No Special Parts Are Required

Death of John Fritz

Yielding to the infirmities of age, John Fritz came to the end of his earthly career at his home at Bethlehem, Pa., February 13, in his ninety-first year. He was truly an example of a man dying "full of years and honors." No man in the American iron trade, and perhaps in the world, has been so universally revered by iron and steel manufacturers and held in such affectionate esteem as Mr. Fritz, who has long been called the Nestor of the American iron trade. He not only attained eminence as a manufacturer but was accorded distinction by numerous societies, having been president of the American Institute of Mining Engineers; president of the American Institute of Mechanical Engineers; honorary vice-president for life of the Iron and Steel Institute, London; honorary member of the American Society of Civil Engineers; honorary member of the American Iron and Steel Institute; received the degrees of A.M. from Columbia University, D.Sc. from the University of Pennsylvania, D.Eng. from Stevens Institute of Technology, and D.Sc. from Temple University; honorary member of the Franklin Institute, Philadelphia, and recipient of the Bessemer gold medal of the Iron and Steel Institute, the John Fritz medal, the Centennial Exposition bronze medal, Louisiana Purchase Exposition bronze medal and Elliott Cresson gold medal of the Franklin Institute. The following data have been mainly taken from Mr. Fritz's autobiography, published by John Wiley & Sons, New York:

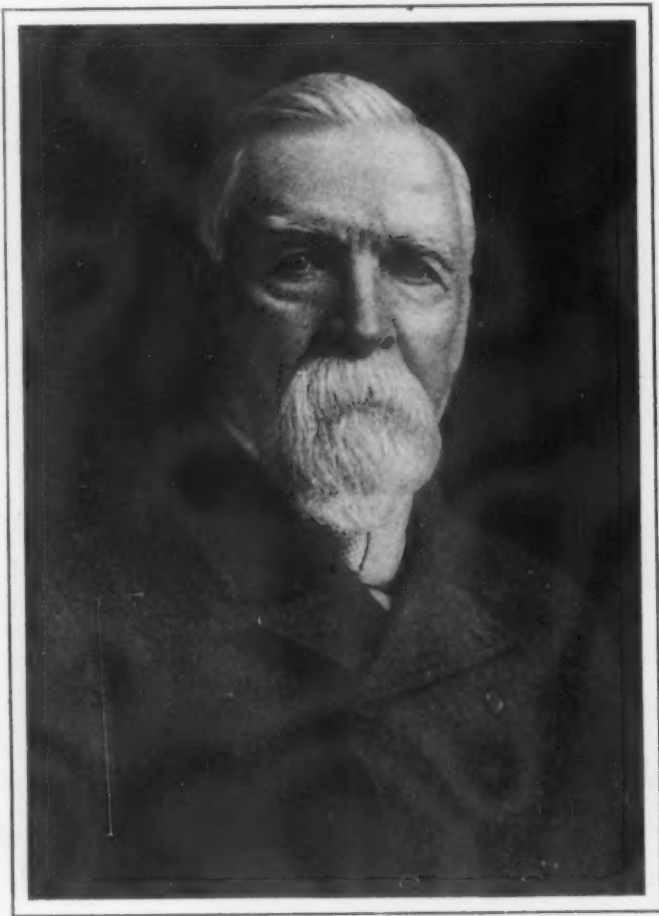
John Fritz was born August 21, 1822, in Londonderry Township, Chester County, Pa., and was the oldest of a family of seven children, comprising three boys and four girls. The father was a native of Germany, who came to this country in 1802 with his father and mother, learned the trade of millwright and followed that occupation in connection with farming. The mother was a native of Chester County, but of Scotch-Irish parentage. Mr. Fritz left his parents' farm at the age of sixteen, securing employment in a country machine shop at Parkesburg, Pa. His only education up to that time had been acquired in local schools, in which, however, he distinguished himself for his proficiency in mathematics. At Parkesburg he learned the trades of blacksmithing and country machine work. After serving his time he started a machine shop, but found there was little or no outcome from it.

Having his attention turned toward the rolling mill business, he went to Norristown, Pa., in 1844, and secured employment in the works of Moore & Hooven. At that time John Griffin was general manager of the rolling mill operated by this firm. Here he was shortly placed in charge of the machinery of the plant as millwright. Deciding to learn the iron business practically in all its departments, he gave close attention to puddling and after much observation gained sufficient knowledge to build a much improved furnace for both puddling and heating. He became superintendent of the plant. While he was engaged in this rolling mill the works acquired a high reputation for the grade of car axles manufactured there.

In 1849 Mr. Fritz went to Safe Harbor, Pa., where Reeves, Abbott & Co. had started the erection of a rail mill and blast furnace. John Griffin had been secured as general superintendent of the plant. The works were erected, and here he learned something of the construction and operation of a blast furnace. The locality, however, was scourged by fever and ague, and it was necessary for Mr. Fritz to leave it for the sake of his health. After his recovery he journeyed through the West, going to Lake Superior. In 1852 he returned to Norristown, re-entering the employment of Moore & Hooven. About this time Reeves, Abbott & Co. leased the Kunzie blast furnace on the Schuylkill River, about twelve miles from Philadelphia, and induced Mr. Fritz to take charge of it. He accepted the position because he was anxious to learn something more of blast furnace practice. The furnace had been built by Mr. Kunzie, of the firm of Farr & Kunzie, manufacturing chemists, Philadelphia, who was an able chemist but without mechanical or metallurgical knowledge, and the furnace had been unsuccessful from a business standpoint.

Under the management of Mr. Fritz it did well, made good iron and was considered the best furnace on the Schuylkill River. Having secured the practical furnace experience he desired, he removed to Catasauqua, Pa., and started a machine shop and foundry in connection with his brother George and two brothers-in-law, B. F. Stroud and Isaac E. Chandler. Dullness in the iron business made his stay in Catasauqua not only brief but somewhat unprofitable.

About this time it happened that David Reeves, of Reeves, Abbott & Co., had become interested in the Cambria Iron Works at Johnstown, Pa., and asked Mr. Fritz to go there as general superintendent. In June, 1854, he arrived at Johnstown. Here he acquired experience in the management of a very large plant for the time and established a world-wide reputation. He invented the three-high rail mill, which was a noteworthy improvement for those days. For six years he applied himself earnestly and



JOHN FRITZ

faithfully, without any vacation, to the advancement of the interests of the company, and in July, 1860, decided to sever his connection. In that time a rail mill had been built which was far in advance of any other mill then in existence, and proved to be a great commercial success. The mill had made "a better rail, doing away with all patching, and increasing the production four-fold, and out of the two small driven rollers came the present system of handling the work in mills, by the use of live rollers, by the heavier, stronger and better fitting up of the mill without breaking points, by the improvement in the arrangement and better fitting up of the side guards, by the closing of the grooves in the roughing mills, by the increase in the width of the pile, by the increased length of the furnace, and by the increased height of the furnace roof, which carried the heat much farther, thereby enabling eight 9-in. piles to be charged instead of six 5 and 6-in. piles. All these improvements were calculated to improve the quality of the work, and increased the production, both important factors."

On July 6, 1860, he reported for duty with the newly organized Bethlehem Iron Company, Bethlehem, Pa., having accepted the position of general superintendent and chief engineer. This company had decided to build a plant and no work had been done until Mr. Fritz arrived on the ground. By the last of July construction work was undertaken on two blast furnaces and a rolling mill. By the summer of 1861 the rolling mill was built and one of the blast furnaces erected. This furnace was an innovation, as the shell was built of plate iron. He had charge of the manufacturing operations of the company for a third of a century, adding to its iron plant Bessemer and open hearth steel works, starting the manufacture of armor plate and ordnance on this side of the Atlantic, and developing the manufacture of heavy steel forgings. Retiring from active service with the company in 1892, he continued to be consulting engineer for some years. After his withdrawal from his connection with the manufacture of iron and steel he was actively engaged in public and private work, his advice being sought freely and frequently.

In 1902 Mr. Fritz's eightieth birthday was celebrated in a unique manner. His friends seized the occasion to announce at a banquet held in his honor on October 31 at the Waldorf-Astoria, New York, the raising of a fund for the establishment of a John Fritz gold medal, to be given for scientific or industrial achievements. A cast of the medal, as modeled by the artist, was presented to Mr. Fritz at the dinner. The recipients of the Fritz medal since then have been Lord Kelvin, George Westinghouse, Alexander Graham Bell, Thomas A. Edison, Charles T. Porter, Alfred Noble, Sir William H. White and Capt. Robert W. Hunt.

Mr. Fritz leaves no immediate family, his wife having died several years ago. They had one child, a daughter, who died at the age of seven.

The Hardening of Plates by Wetting One Face

The hardening of extra soft steel plates by wetting or sprinkling one of the faces of the plates has, according to A. Olry et P. Bonet, in the bulletin of the Association des propriétaires d'appareils à vapeur du Nord de la France, produced a better result than hardening by immersion. The Lievin mine has installed a testing chamber of about 7 ft. in diameter, of which the walls are made of steel plates, a single plate, about $\frac{3}{4}$ in. in thickness, being used for each ring. The steel has a content of manganese between 0.25 and 0.45 per cent. and phosphorous below 0.02 per cent. The plates have to resist experimental explosions and it was necessary to temper them as much as possible to give them maximum resistance to shock. Tempering by immersion, in itself, would make necessary considerable machining, it is stated, and so the method of wetting one face of the plate was tried. The wetting is stopped as soon as the red color disappears and is taken up again over the entire surface or such parts of it as again become red on account of the heat flowing from the interior. It was found that the hardening effect was produced satisfactorily through the entire thickness of the plate.

The Fulton Pit Car Company, Canal Fulton, Ohio, states that the Fulton Pit Car & Mfg. Company, recently incorporated, was organized to erect new buildings, buy new equipment and to complete this at a given date, set approximately as July 1, 1913, at which date the new company will take over all the assets and holdings of the old one. The stockholders in the former concern will, however, continue in control of the operation of the latter and the old company will continue to operate the same as usual until the time the new one is ready to take the business over. The improvements comprise the erection of a main building, 80x220 ft.; a foundry building, 80x150 ft., with connected cupola room, 30x40 ft., and a power plant, 30x50 ft. The buildings will be of concrete and steel, with steel sash. Contracts for the buildings have been let. The power plant will be equipped with a direct connected engine and dynamo. The company will be in the market for some new machinery, but states that it will not have its list out before April or May.

Road Tests of Chrome-Vanadium Wheels

A recent report from the Vandalia Railroad of the results of comparative service tests, extending over several years, of chrome-vanadium and carbon steel tender wheels shows that the chrome-vanadium wheels averaged $2\frac{1}{2}$ times as much mileage per unit diameter of wear and turning as those of carbon steel under the same class of tenders operating in similar service. The tenders to which the wheels were applied were of 7500 gal. water capacity and 12 tons coal capacity, with an average load per wheel of 17,875 lb. and were operating in passenger service. After $3\frac{1}{2}$ years' service the chrome-vanadium wheels averaged 152 per cent. more mileage per 1/16 in. diameter wear and turning than the carbon steel wheels.

From analysis of the data obtained in these tests, the Vandalia Railroad draws the following conclusions as to the relative advantages shown of the chrome-vanadium wheels: Great uniformity of material and greater mileage per unit diameter of wear. As a direct result of these, less flange wear and less material wasted in turning wheels in the lathe with consequent greater mileage per unit diameter of wear plus turning. An entire absence of shelled or burned spots in treads, which under the existing service conditions were found to occur in the carbon steel wheels.

The records cover 10 mated pairs of carbon and 16 mated pairs of chrome-vanadium solid steel wheels. Records of 26 other chrome-vanadium tender wheels are now being kept by the road. At the present time the chrome-vanadium wheels under observation have made over 300,000 miles, and it is reported that there is every probability of their reaching 400,000 miles.

It might be expected from the physical properties of these wheels that some difficulty would be experienced in machining them after they had been in service and needed truing up. Such was not the case, however, as they were turned without difficulty in the truck wheel lathe at the speed of 17 ft. per minute. In the past few years investigations have been conducted to determine the most satisfactory commercial method of heat treating chrome-vanadium wheels. The method now consists of heating the wheel to a certain temperature, and then spinning it for a predetermined time in a trough of water with the tread immersed to a little below the limit of the wear line of the wheel. It is then taken out and allowed to cool in air, after which it is reheated for annealing. By this method of heat treatment, the plate and the hub are not affected by the immersion of the rim in water, but are really undergoing an annealing operation while the rim is being hardened. High and uniform scleroscope hardness was obtained across the cross-section of the rim, which averages somewhat higher than 45, the average shown by the Vandalia wheels that gave such high mileage; also the hardness tapered gradually and uniformly to a softer metal in the plate and hub.

The chemical range of the wheels tested under the method of heat treatment described was as follows: Carbon, 0.56 to 0.65 per cent.; manganese, 0.60 to 0.85 per cent.; phosphorus, under 0.04 per cent.; sulphur, under 0.04 per cent.; silicon, under 0.15 per cent.; chromium, 0.90 to 1.20 per cent.; vanadium, 0.18 to 0.24 per cent.

Results from these investigations indicate that the best wheel should show on the tread and on the face of the wheel a scleroscope hardness of 40 to 55. This would represent by a test across the tread of the wheel an elastic limit of around 85,000 to 90,000 lb. per square inch, with an elongation in 2 in. of not less than $12\frac{1}{2}$ per cent. and a reduction of area of not less than 40 per cent.

The Central Foundry Company, 90 West street, New York, is distributing an illustrated booklet which describes that part of the high pressure fire service system of Philadelphia in which the Universal pipe made by this company was used. The district served by this system required about 31 miles of cast-iron pipe. The pipe was thoroughly tested with pressures varying from 100 to 800 lb. per sq. in. before the contract was placed. The mains are under a static head of about 50 lb. from the reservoir continually. Under this pressure the leakage is not appreciable. Results of pumping station tests are given which show that leakage from joints, valves, stuffing boxes and fire hydrants on the line is remarkably small.

The Capacity of Metal Working Machines*

Ways in Which the Superintendent Can Learn the Most About Feeds and Speeds—Some Unpublished Tests

BY STUART DEAN

A cutting speed of 100 to 120 ft. per minute is about correct for outside turning of soft steel, while 75 to 80 ft. per minute is about right for soft cast iron. For inside or boring work, 40 to 60 ft. is the proper figure, and 500 ft. per minute is the speed for brass turning. Recently a satisfactory high-speed steel for brass has been made. The tool steel maker is improving tool steel so rapidly that these speeds probably will be increased 15 per cent. in the next five years.

Tool Steel Tests

For testing tool steels a casting made especially for this purpose should be kept on hand. It will be a massive disk of cast iron, say, 18 in. diameter and 8 in. thick, with bolting-down ears cast on it and a tapped hole through the center for a lifting eye-bolt. The analysis of the iron in the test casting used by the writer is as follows:

Silicon	1.48	per cent.
Manganese	1.07	per cent.
Graphite carbon	2.56	per cent.
Combined carbon .....	.91	per cent.
Phosphorous .....	.328	per cent.
Sulphur .....	.069	per cent.

This, however, is not the mixture we use in our castings. The silicon is lower, the manganese is higher and

the sulphur lower than in our castings. This casting was made especially to test tools on. Any mixture would do as the test is a competitive one of each tool against every other tool.

Test the tool steels by starting a facing cut at the center of the disk and face out toward the periphery. Adopt a certain standard speed, feed and depth of cut. The different kinds of tool steels will break down at different diameters. The steel that stands up on the cut of greatest diameter is the one to adopt. This method of testing gives a true result. The test piece is the same for all steels. It is handy to set up and take out of the machine. It is the only good way to settle the tool steel question.

By means of this test piece and other observations described later, the writer had cutting speed tables for Mushet self-hardening steel pretty well made up before F. W. Taylor published the results of his experiments.

As a result of his tests the author patented a cutting tool using self-hardening steel that would cut nearly as fast as the present high-speed steel. A piece of Mushet steel was cast in a heavy copper holder so that only the bare cutting point or edge of the steel showed outside of the copper. The copper carried away the heat as fast as it

Table I.—Cylinder Boring Lathe Data

Feet per Min.	Total Cu. In. of Each	EACH TOOL			Rough or Finish	Diam., In.	Name and Shape of Tools	No. of Tools	4x½ in. Belt.
		Cu. In. each Cutter	Feed, In.	Depth, In.					
22	6.14	6.14	½	⅜	Rough	5½ raised to 6 ⅜	.....	1	
19	.....	0.44	⅜	⅜	Finish	14½	Novo	.....
17½	.....	1.5	1-48	⅜	.....	.....	.....	.....
35	29½	14.75	½	⅜	Rough	16	Rex AA	2	1 in. total feed 8 r.p.m. 9½ min. on cut. Beyond belt limit. Held belt with a stick. Stalled five times. Limit of tool steel. Chips size of corn and wheat.
35	6.58	3.28	½	⅜	Second	16	Burgess No. 5	2	1 in. total feed 9½ min. on cut. 14 r.p.m.
30	5.6	2.82	⅜	½	Rough	8½	Burgess No. 5	2	1 in. total feed 14 r.p.m.
39	7.4	3.6	⅜	½	Rough	18	Burgess No. 5	2	1 in. total feed 8 r.p.m. HARD. Cylinder. Limit of tool steel.
30	8.5	4.25	⅜	⅜	Rough	8	Burgess No. 5	2	1 in. feed 14½ r.p.m.
33	6	3	⅜	½	Rough	16	Burgess No. 5	2	1 in. feed.
35	24	6.15	⅜	⅜	Rough	18	.....	4	Double rig ½ in. total feed. PACE.
26½	15	.....	⅜	½	Rough	12	.....	4	Double rig but no chucking jig. Two separate cylinders. ⅜ total feed.
45	12½	.....	⅜	½	Rough	12	.....	4	Double rig. Chucking jig.
62	26	13	⅜	½	.....	16	.....	2	15 r.p.m. ⅜ in. total feed. Finished next speed slower ½ feed. Fine finish.
46	7	.....	⅜	½	Rough	12	.....	.....	14½ r.p.m. ⅜x⅜x⅜ in., size of each individual chief grain.
57	11½	2½	⅜	½	Second	14½	.....	2	15 r.p.m. Belt loose and slipping slightly. ⅜ total feed.
46	4.29	2.15	⅜	½	Rough	12	Burgess No. 5	2	1 in. total feed 1-256 area of cut. SLOW.
45	4.20	2.1	⅜	½	Rough	12	1½x1 Novo	2	1 in. total feed 6 in. x 8 ft. bar. 12 in. cylinder.
37½	14	3.51	⅜	½	Rough	Two 9½ bushes	1 Sq. Burgess	2 in a bar	1 in. total feed. Double rig. 15 r.p.m. Just could bear hand on bush. Hot, 7 cu. in. each side. Belt 1,247 ft. per min.
PACE FOR MACHINE	36	6.75	1.69	⅜	Rough	10	.....	4	1 in. total feed 14 r.p.m. Double rig. 2 cutters each bar.
33½	6.25	6.25	⅜	½	Rough	16	Self hard	1	NOTE 1 Single end scrap cutter.
30	8.4	4.2	½	⅜	Rough	14	Burgess No. 5	2	1 in. total feed 8 r.p.m. 2 cuts only 8 min. duration of cut.
30	5.6	2.8	½	⅜	.....	.....	.....	2	1 in. feed total. 8 r.p.m. 4 min. cut.
PACE Finish	30	16.8	8.4	⅜	Rough	7½	.....	2	1 in. total feed 15 r.p.m. Held belt with a stick. Chips ⅜x⅜x⅜ in. Very soft iron.
PACE Beyond belt pull	33	12	6.1	⅜	Rough	16	Burgess No. 5	2	1 in. total feed. 8 r.p.m.
	33	6.1	6.1	⅜	Rough	16	Burgess No. 4	1	8 r.p.m. Note single end cutter.
	30	5.62	2.8	⅜	Rough	14	Burgess No. 5	2	1 in. total feed.
	30	11.24	5.6	½	Rough	.....	.....	2	1 in. total feed. Belt slipped. 8 r.p.m.

*Copyright, 1913, by Stuart Dean. Fifteenth article on Shop and Foundry Management. The fourteenth article, "Little Economies for the Machine Shop," was printed in the issue of February 6.

was generated at the point and thus allowed an increase in cutting speed. About a year after this patent issued Taylor

and White's articles on their tool steel experiments at the Bethlehem Steel Works were published, and this resulted in dropping the tool holder and adopting high-speed steel when it came onto the market.

The Best Shape of Tool

The best shape tool is one ground to a round nose at the end. The top of tool is the shape of the end of a man's thumb. The top surface should slant some so as to give a lifting effect on the chips, not a scraping effect. The clearance between the end of the tool and the work should be very small.

We now use high-speed cutting steel altogether in our work, except on brass. On this we use self-hardening steel. High-speed steel fails to hold a keen edge and cannot be used on brass, as a dull tool on brass will burnish the work.

Things the Superintendent Should Know

The superintendent must become not only a hard-working student on the subject of speeds and feeds and cubic inches per minute; he must become an authority on it. He must know the exact capacity of each machine tool in his plant. He cannot carry all of this knowledge in his head, so he should make out a book ruled as here

Ft. Per Min.	Total Cubic Inch Per Min.	Cubic Inch Per Each Cutter	Total Feed	Feed For Each Cutter	Depth	Roughing or Finishing Cut	Diam. of Work	Name and Shape of Tool Steel	Remarks
--------------	---------------------------	----------------------------	------------	----------------------	-------	---------------------------	---------------	------------------------------	---------

shown and having the same headings across the top of the pages.

Accumulating Machine Data

Each machine in the plant should have a separate page or a number of separate pages in this book to represent it. The pages should be numbered with the same numbers that have been given the machines. This book should be loose-leaf, as on some of the important machines there will be three or four pages of these statistical notes. For instance, the cylinder boring lathe page will read as shown in Table I.

The space under "Remarks" will gradually fill with such notes as: Limit of power of the machine; hard cast iron; tool O. K.; cut ten minutes; made machine quiver; broke driver; very heavy cut; belt broke after nine minutes' run; chips size of small corn grains; tool steel

for this. These tables are used instead of the slide rule. On each step of each cone on each machine in the plant is stamped the spindle speeds when the belt is on that step. This is to get rid of using a watch and is used by the workmen in selecting speeds. A single back geared machine has two of these numbers on each step of the cone.

The Drapier boring lathe cone steps are stamped 234-14½, 132½-8½, 88-4½, etc. These are the revolutions per minute that the spindle of the machine runs. When the belt is on the 132½-8½ step the spindle runs 132½ revolutions per minute with the back gears out and 8½ revolutions per minute with gears in. These speed figures are put at the bottom of the table for the Drapier boring lathe, as shown above.

Holding Machines to their Work

This seems like a lot of work, but there is nothing the superintendent can do that will prove so profitable to the firm. It will bring him face to face with the fact that the output of his plant is mighty poor. The foremen will get interested in the output at the point of the tool and become faddists on the subject. The workmen soon learn what the correct cutting speeds are.

A plant is like a family with a lot of children. All cannot become great producers. Some are weaklings. The machines are the children of a plant. They all have different capacities for work, and no fixed iron-clad rule can be laid down for all alike. A machine having the power of drive and power of feed capable of taking off 12 cu. in. of cast iron chips per minute should be held up to this rate. Not only the cutting capacity of each of the older machines, but the cutting capacity for each step of the cone on each machine has to be found by test on the machine's regular work, and a table made out for the machine. Cutting capacity (cubic inches of iron removed per minute) is more important than cutting speeds. It is possible, even on an old, weak machine, to take a cut at over 1000 ft. per minute if the amount of metal removed per minute is kept small. Nothing counts but cubic inches of metal removed per minute.

Superintendent Vs. Machine Salesman

A great thing about the superintendent's taking up this work personally is that it puts him in a position where he knows absolutely what to specify when he orders new machine tools. New tools are not as yet up to the capacity of the tool steel, except in a very few cases. Any one who

Table II—Capacity Table for No. 98 Drapier Boring Lathe, 12 Cu. In. per Minute—Speeds, 28-48 Ft. per Minute

Diam. in.	Rev.	Ft.	Cut ⅜ in. Deep	Cut ½ in. Deep	Cut ¾ in. Deep	Cut 1 in. Deep	Cut 1 ¼ in. Deep
30	4½	35	⅓ feed 8 cu. in.	⅓ feed 13 cu. in.	⅓ feed 9½ cu. in.	⅓ feed 13½ cu. in.	⅓ feed 12½ cu. in.
24	4½	28	⅓ " 13 "	⅓ " 10½ "	⅓ " 8 "	⅓ " 10½ "	⅓ " 10½ "
22	8½	48	⅓ " 11 "	⅓ " 9 "	⅓ " 7 "	⅓ " 9 "	⅓ " 9 "
18	8½	40	⅓ " 9 "	⅓ " 7½ "	⅓ " 11 "	⅓ " 7½ "	⅓ " 7½ "
14	8½	33	⅓ " 7½ "	⅓ " 12 "	⅓ " 9 "	⅓ " 12 "	⅓ " 12 "
10	14½	38	⅓ " 9 "	⅓ " 7 "	⅓ " 11 "	⅓ " 7 "	⅓ " 7 "
8	14½	30	⅓ " 7 "	⅓ " 11 "	⅓ " 8½ "	⅓ " 11½ "	⅓ " 11½ "
7	26	48	⅓ " 11 "	⅓ " 9 "	⅓ " 7 "	⅓ " 9 "	⅓ " 9 "
6	26	42	⅓ " 10 "	⅓ " 8 "	⅓ " 11½ "	⅓ " 8 "	⅓ " 8 "
5	26	34	⅓ " 8 "	⅓ " 12½ "	⅓ " 9½ "	⅓ " 12½ "	⅓ " 12½ "

Spindle speeds, 234-14½; 132-8½; 80-4½; 47-2½; 26-1½.

burned, but drive O. K.; belt slipped; tool post shaky; sparks from tool; have to reduce speed to prevent chatter; feed broke on this cut; casting so hot could just bear hand on it; chips ⅓ x ⅓ x 3/32 in. stalled the motor, etc.

From these notes the superintendent can make out a capacity table for each machine. It will be a table giving the maximum that the machine can safely stand. It will be the output measuring stick. For instance, the capacity table for the above cylinder boring lathe would look like Table II.

The explanation of Table II is as follows:

The table was made for the No. 98 Drapier boring lathe covering all the feed and speed combinations that could produce a cutting output of approximately 12 cu. in. per minute. Similar sheets were made out for 10 cu. in., 8 cu. in., etc. These were referred to in making cutting tests to avoid figuring each time. Taylor uses a slide rule

buys a heavy cutting tool that is not able to easily burn the tool steel is buying what will be an obsolete machine in a few years. One cannot depend on what the tool salesman says, yet, if the superintendent is not an authority on cutting speeds, feeds, cubic inches per minute and capacity of modern tool steels, how can he intelligently select a machine tool to do his work?

The machine salesman will tell him that a feed of 5 in. per minute is the practical limit on milling work. He will try to sell a machine to run at a cutting speed of 60 ft. per minute when it ought to run 75, 80 or 90 ft. on cast iron milling. His reason is that he knows that his machine lacks the horsepower to take the heavy feeds and speeds.

The salesman will say that this is what certain other shops, which he mentions, are doing. Now here is just the point: The firm should be turning out 20 or 50 per cent. more on their machine tools than these shops.

The Scoria Process of Utilizing Flue Dust

A German Method of Briquetting Fine Ore and Flue Dust with a Slag Binder and of Manufacturing Slag Bricks

A process which has been named the Scoria process because it employs blast furnace slag as a binder has been in use in Germany for about three years for utilizing fine ores and flue dust. Besides delivering a product commercially promising in that it resists atmospheric disintegration, breakage in transportation and destructive influences in the blast furnace, the process is applied to making slag brick; and the fact that the one plant could be made to take care of three branches of manufacture is regarded as a marked advantage in considering a system for dealing with the flue dust trouble. It is stated that actual operations have shown a reduction in coke consumption of from 15 to 20 per cent. and an increase in pig-iron production to a point where it is possible to produce 1 ton per day for every 35 cu. ft. of inside furnace volume.

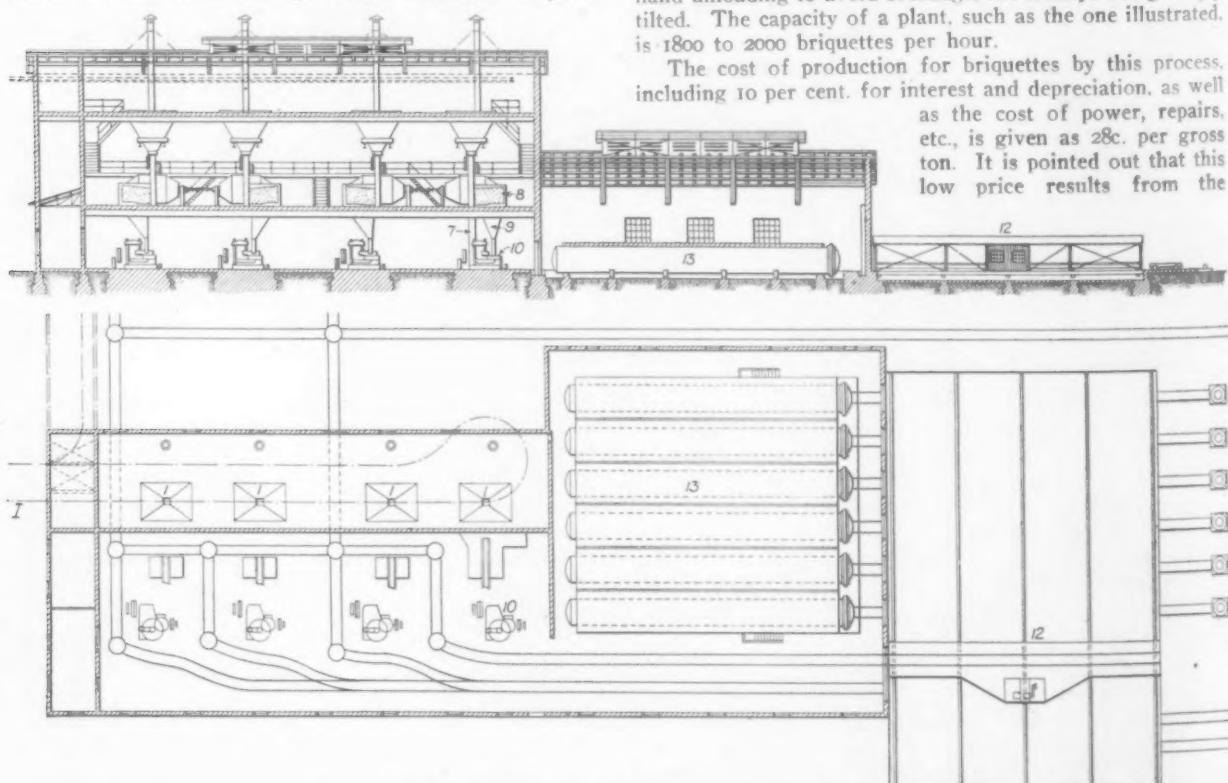
The Krupp works at Rheinhausen, Germany, where a Scoria plant has been installed for some time, has, it is explained, decided to increase the daily capacity of the plant to 400 tons, which is equal to the entire flue dust production and a considerable amount of fine ore besides, and another company in the same district is erecting a plant having a daily capacity twice as great. One of the chief reasons given for its adoption was the observation that by its use the general run of the blast furnace was quieter and an appreciable reduction in flue dust was obtained with a comparatively small quantity of briquettes. At the Rheinhausen plant the percentage of briquettes in the burden has been increased to 43 per cent. of the total charge.

It is claimed that the satisfactory operating conditions are almost entirely due to the adaptability of the slag as a binder for briquettes for blast furnaces. While the briquettes are descending the stock columns, the slag acting as a hydraulic binder, keeps the solid body porous and easily accessible to the action of the gases but as soon as the briquettes arrive at the melting zone, the function of the slag changes from that of a hydraulic binder to that of a fusion binder. Here it not only maintains the outline of the bricks and gives substance and shape to

the stock column but in addition the intimate mixture of minute particles of ore and lime composing the brick carries the flux in itself and makes the material as readily smeltable as any sinter product.

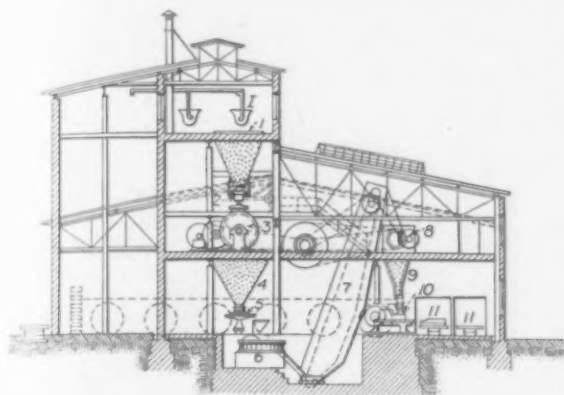
In the accompanying drawings are shown the plan and elevations of a plant for making iron ore and flue dust briquettes. Outside of the plant there is located a large storage bin from which the raw materials, ores, slags, etc., are carried by an elevated conveyor into the mixing or pressing rooms which are situated on the third or top floor of the plant. From the conveyor, the material is discharged into a bin, 1, and from here they go through a hopper, 2, into the steaming drums 3 arranged on the second floor. Here the briquetting mixture is treated with steam at a moderate pressure and after the completion of this operation the material runs in a continuous stream into a hopper, 4, over the scraping plate 5 and to the kolleingang, or grinding and mixing trough 6. The material which is now ready for pressing is carried by a bucket conveyor, 7, to the drum sieve 8. The function of this drum is to serve as a protection against foreign bodies, iron, etc., which may accidentally still remain in the material and these are thrown aside before it passes into the bin 9. From the bin the material goes to the briquette press 10 and from here the pressed forms are transferred to the trolley 11. These trolleys are formed into trains and are moved by an electric winch to the tracks of the transfer table 12 which serves to transport the pressed forms to the hardening kilns 13 as well as the return of the trolleys from these kilns to the tracks leading to the blast furnace. From these tracks the empty trolleys are taken back over turntables to a special track for empty cars located between the two press buildings. The pressed forms remain from 4 to 8 hr. in the hardening kilns, exposed to steam at a pressure of 120 to 150 lb. In this way the blast furnace slag used as a binder combines with the oxides of iron and the briquettes leave the kilns as products which require no subsequent hardening and are available for immediate use in the blast furnace. This does away with hand unloading to avoid breakage, the trolleys being simply tilted. The capacity of a plant, such as the one illustrated, is 1800 to 2000 briquettes per hour.

The cost of production for briquettes by this process, including 10 per cent. for interest and depreciation, as well as the cost of power, repairs, etc., is given as 28c. per gross ton. It is pointed out that this low price results from the



Plan and Longitudinal Section of Briquetting Plant Using the Scoria Process

cheapness of the slag binder itself as well as from the fact that only a small amount of the binder is used and the briquettes are turned out ready for immediate transport-



Cross-Section of Briquetting Plant

tation and use. A set of estimates was made for a German plant, specifying a special installation for the preliminary drying of the ores and an amortization charge of 15 per cent. on the entire plant, including not only the machinery but also the buildings and the cost of electric power. Assuming that only one press was installed, which would be of the smallest and most inefficient scale of operation, the cost of 1 ton of briquettes was 1.70 marks or 40.68c. and 2.19 marks or about 52.41c. if the cost of the preliminary ore drying was included. If two presses were working, the cost of the briquettes per ton would be reduced to 31.59c. and 42.36c. if the ore was dried before being used. This same plant could also be employed for the production of slag brick, without any alteration to the machinery or buildings. The cost of these bricks with a one-press plant would be \$1.625 per thousand and \$1.268 if two presses were employed. These figures, of course, do not include the cost of transporting the bricks or the briquettes after they are made, as this varies in each individual case.

American Iron & Steel Mfg. Company's Report

The American Iron & Steel Mfg. Company, Lebanon, Pa., has issued its thirteenth annual report, covering operations for the year ended December 31, 1912. Dividends amounting to \$388,500 were paid, \$83,477.24 was added to the value of real estate, plants and equipment, and \$50,000 was added to the allowance for depreciation of plants and equipment. The total allowance for such depreciation now amounts to \$930,000. The following is the balance sheet as of December 31, 1912:

Assets	
Current Assets:	
Cash	\$466,475.67
Bills receivable	None
Accounts receivable net	725,995.56
Inventory	1,763,461.44
Insurance and taxes—unexpired value	6,645.92
	\$2,962,578.59
Fixed Assets:	
Real estate, plants and equipment	6,004,139.31
Less allowance to provide for depreciation	930,000.00
	\$5,074,139.31
Total	8,036,717.90
Liabilities	
Current Liabilities:	
Wages—accrued, not due	None
Accounts payable	None
Capital Liabilities:	
Preferred stock	\$3,000,000.00
Common stock	2,550,000.00
Undivided profits subject to payment of dividends, payable January 1, 1913	2,486,717.90
Total	\$8,036,717.90

The recent fire damage to the rolling mill of the John A. Roebling's Sons Company at its Trenton, N. J., plant will be immediately repaired. It is stated that the machinery was but slightly damaged and that repairs to it and the building will not require extended time. Meanwhile the work done by this department will be taken care of in other parts of the plant.

Fuel Oil in the Foundry Cupola

Herbert Lang, Oakland, Cal., contributes to the Mining and Scientific Press, San Francisco, an interesting discussion of the use of crude oil in copper smelting furnaces, concluding with the following statement regarding a foundry cupola running successfully with oil for fuel:

Wallace Dow, of the Geo. E. Dow Pumping & Engine Company, Alameda, Cal., has constructed a melting cupola of his own invention, in which oil is the sole fuel. It has proved an unqualified success, melting with regularity the pig iron for the numerous castings manufactured by that company and doing it with an economy unapproached by coke-burning apparatus. I believe he saves fully three-fourths the cost of fuel by the substitution of petroleum for coke, and there is the greatest probability that through further experience the economy will prove still more decided. Not only is the melting done with dispatch, but the bath of metal may be kept fluid and in proper condition for pouring for many hours; in fact, there is no reason why it may not remain molten for weeks, since the jets are so arranged in part as to play on the surface of the metal. By this means it becomes possible to cast at any desired time.

The problem before Mr. Dow differs from that which confronts the copper furnace manager, since in foundry practice it is necessary to supply all the heat of melting by the combustion of the oil alone, while in copper matting we get a great proportion of it from the reactions between the ore and the blast inside the furnace. In the one case, the products of combustion must enter the furnace at a very high temperature—perhaps as great as 3000 deg. F.; while in the other the blast, to carry out all the desired objects, need be no higher as a general thing than 1000 deg. F. Indeed, it is generally conceded that with a blast of that temperature no fuel whatever need be used. It is necessary, therefore, to burn but little fuel for the preliminary heating, probably not more than enough to take up one-seventh of the oxygen of the air. Mr. Dow has not as yet accumulated the facts necessary for precise statements of results, but since he has put his furnace into regular operation, it taking the place of two coke-burning cupolas, he will be able shortly to speak with authority on a number of phases on which there are at present only theoretical considerations for our guide.

Fully realizing the desirability of completely burning the fuel before its entrance into the cupola, Mr. Dow has provided his furnace with two heating chambers, one on each side of the shaft at the bottom, in which the atomized oil is brought into intimate mixture with the incoming blast, and from which the hot gases depart through broad apertures over the sole of the cupola. The heat is necessarily very intense, and its effect upon the firebrick of which the structure is composed is very marked. Better fire-resisting materials than the commercial bricks may be necessary for this purpose. Water-jacketing might be resorted to, but for a furnace which is out of commission the greater part of each 24 hours it seems hardly necessary.

The J. G. Brill Company's Year

The J. G. Brill Company, Philadelphia, has issued its annual report covering operations for the year ended December 31, 1912. The total sales of the five plants owned by the company were \$7,842,090.68, against \$5,870,907.47 in 1911. The profit resulting from the operation of the plants in 1912 amounted to \$1,054,851.04. The sum of \$135,826.93 was set aside from earnings as an addition to the depreciation reserve. The balance sheet of the company gives the surplus December 31, 1912, as \$1,233,558.11. On February 1 the orders of the combined companies in process of execution amounted to \$4,140,689. In addition to the increase in domestic orders in 1912, the foreign business of the company made a substantial increase. President Samuel M. Curwen states that the outlook warrants the management in expecting a year of successful and profitable operation.

The Chicago Bridge & Iron Company, Washington Heights, Chicago, has increased its capital stock from \$150,000 to \$600,000 and the number of its directors from five to seven.

The Krupp Steel Works Laboratories

Equipment of the Steel Plant at Essen for Chemical and Physical Examination of Raw Materials and Products of Manufacture

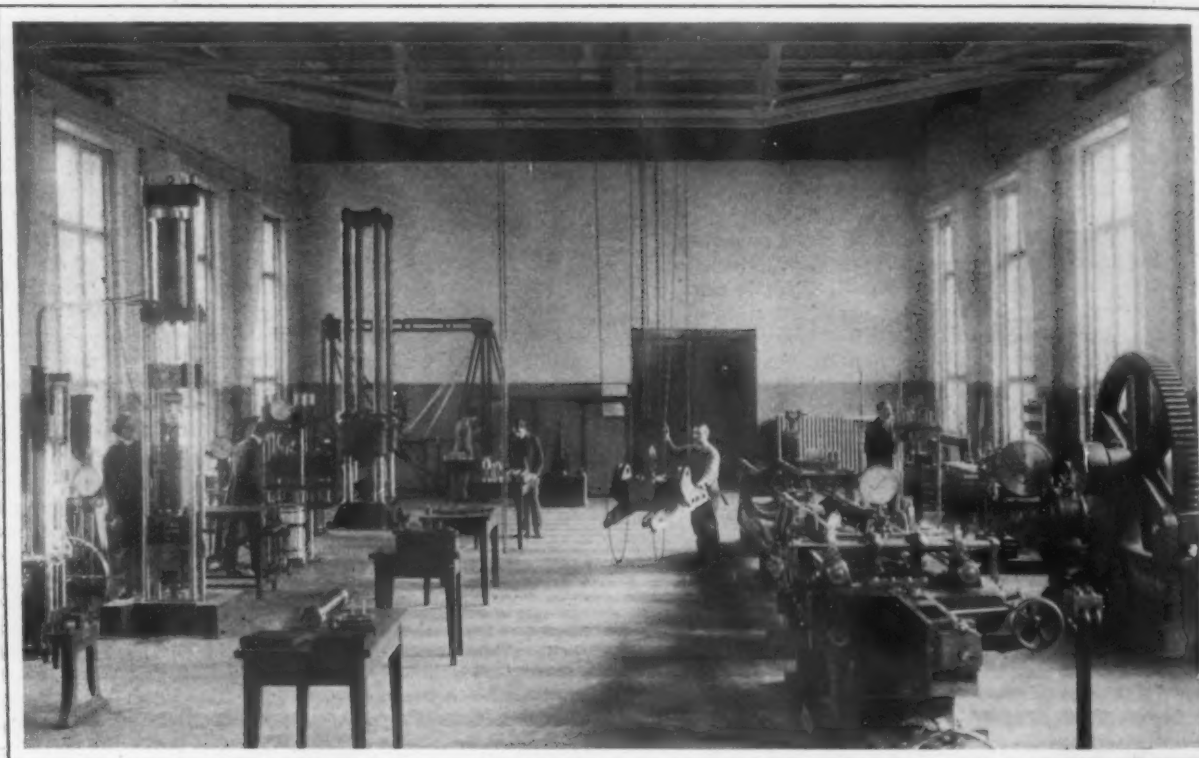
BY DR. ALFRED GRADENWITZ.

As far back as in 1863, the Krupp steel works at Essen, Germany, was fitted with the first scientific testing plant and chemical laboratory for the analysis of steel and raw materials. A real research laboratory on a chemical and physical basis was founded 20 years afterward, in 1883, by Friedrich Alfred Krupp, and this gradually developed into a model establishment.

The present chemical laboratory and the two departments of the testing institute are housed in a building situated near the main administration building. With its central part and two wings it covers a ground area of 39,000 sq. ft., and in its five stories affords an available floor space of upward of 118,000 sq. ft. In the basement are installed the heating mains, ventilating machinery, two

incandescent lamps are used. The electrical furnaces of the chemical laboratory are supplied with 250-volt continuous current. A private telephone plant, comprising 50 connections, allows of communication with the rest of the works.

The chemical laboratory takes up the northern wing of the building and comprises the following departments: Department A, steel analyses; Department B, investigation of other metallurgical products, ores, etc.; Department C, analyses of gas, water, etc.; Department D, oil testing and technical research work; Department E, powder analyses. These departments are housed in the upper stories, whereas the basement comprises the store rooms, the glass blower's shop and a preparatory room where any



View in the Mechanical Testing Hall

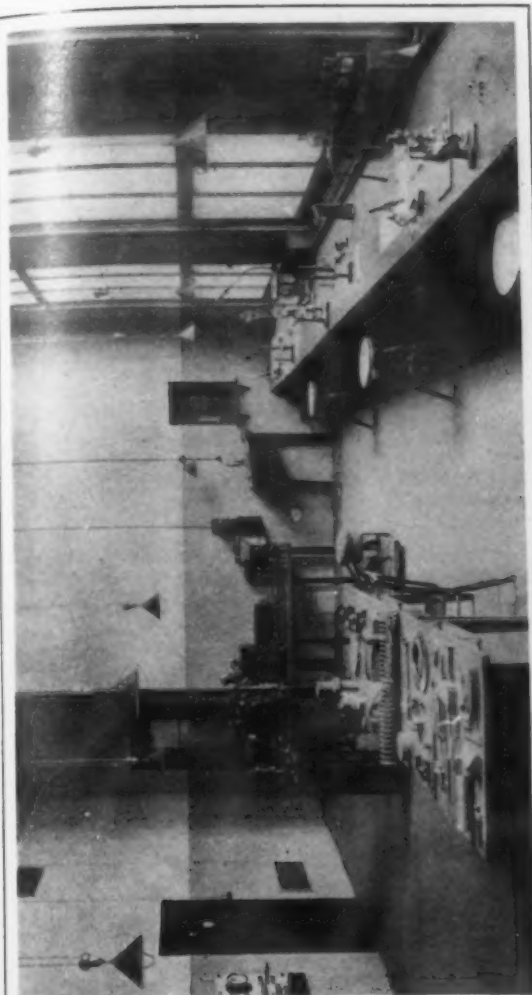
gas compressors, electric converters, accumulators and a hot-water supply boiler. A pipe 2-in. in diameter connects the metallurgical testing laboratory to the river water mains for annealing tests. The gas supply of the chemical laboratory is effected by two pipes entering the building at different points and terminating in gasometers connected together by a 4½-in. pipe. From this connection pipe the gas is drawn off by an electrical compressor and supplies the distribution mains. The testing plant has a separate gas supply conduit and its own gasometer. An electrical compressor brings the gas pressure to 4 to 12-in. water column.

Electrical energy is available in the form of 5000-volt three-phase current and 250-volt continuous current. The high-tension three-phase current is converted by two 175-kva converters into 500-volt three-phase current for driving the motors, and by a 75-kva converter into 250-volt three-phase current for lighting purposes. Three-phase current and continuous current are used side by side for lighting purposes, half of the lamps in each room being connected up to the three-phase current system and the other half to the continuous current system. About 1500

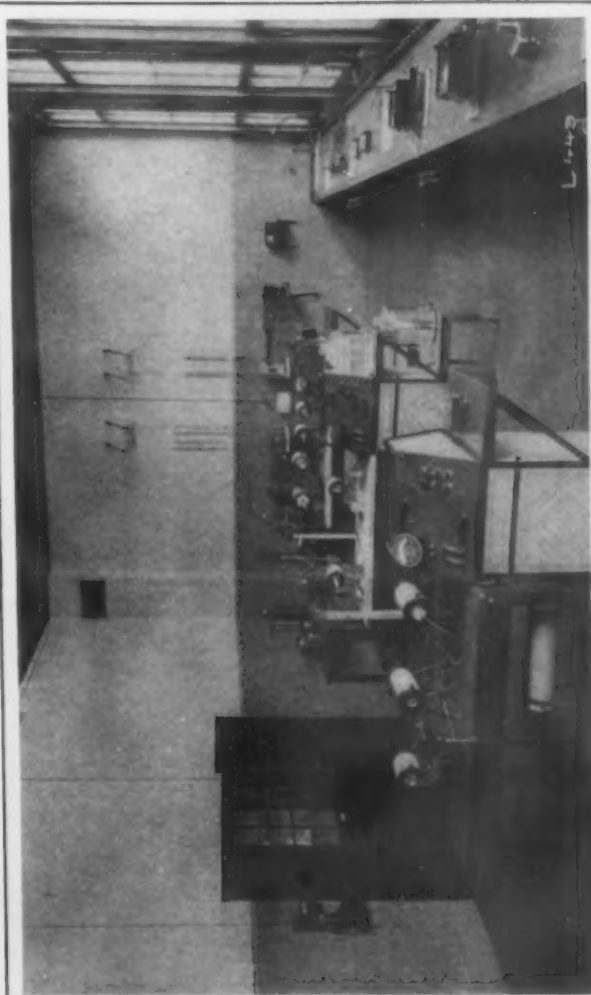
material is crushed and otherwise made ready for analysis.

Department A, which occupies the whole of the first story, is exclusively devoted to steel analysis. A special room is set apart for chemical tests to be made on delivery in the presence of the representatives of clients. The ordinary laboratory work is, however, subdivided, special rooms being reserved to each class of analysis. The carbon room, thus, is set apart for carbon determination by the chromo-sulphuric acid method. A weighing room comprising 14 chemical weighing machines connects this room with the large laboratory where silicon, manganese, phosphorus and tungsten determinations are made. The adjoining room is set apart for titrimetric analyses of nickel. Another laboratory room serves exclusively for chromium and sulphur determinations, while in the adjoining sulphuretted hydrogen room, copper analyses are mainly made. The electrolytic room serves for electrolytical analyses of nickel, copper, etc.

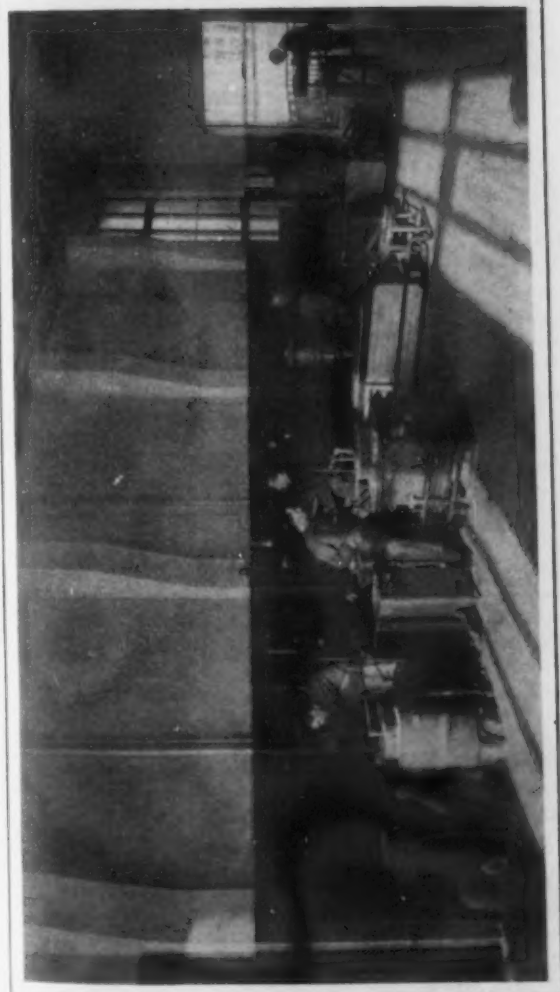
Department B is housed in the second story. Among the materials here investigated should be mentioned: fireproof materials, ores, slags, pig iron, intermediate products, ferro compounds, pure metals, copper alloys,



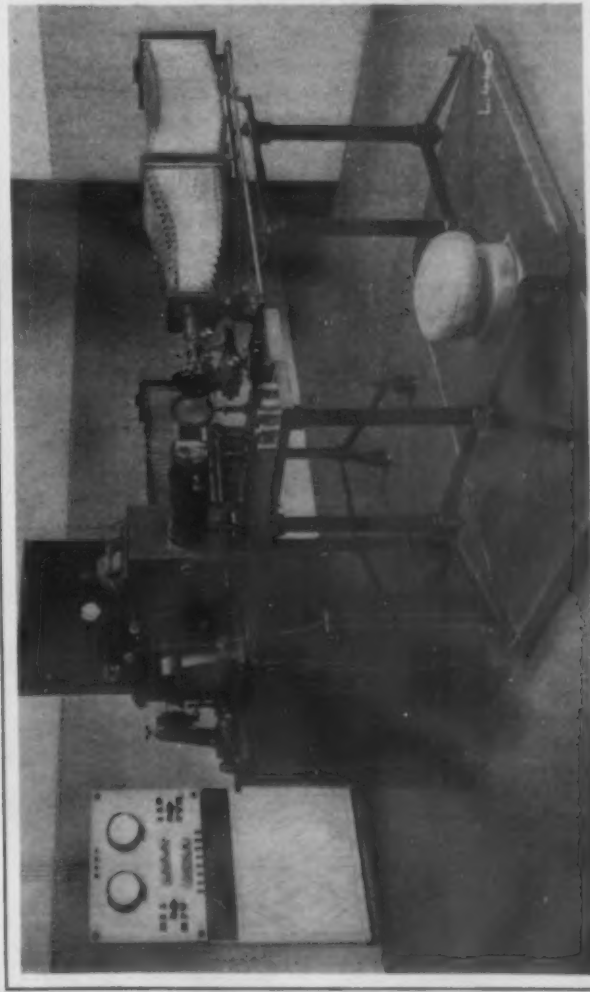
Room for Microscopical Investigations



Room for Thermal Researches



Metallurgical Testing Room



Room for Photomicrographical Investigations

aluminum alloys, white metals, etc., as well as chromium and tungsten steel. The subdivision of this department, as well as the arrangement of its rooms, is quite similar to that of Department A. The carbon and combustion room comprises, in addition to arrangements for carbon analyses on the chromo-sulphuric acid method, an electrically heated muffle furnace for the incineration of graphites, and an electrically heated tube furnace for carbon analyses by direct combustion in the oxygen current. The electrolytic room serves for the electrolytical analysis of copper, nickel, antimony and zinc. Provision is made for 30 cells being worked on simultaneously under four different tensions, 1 to 12 volts current being supplied by an accumulator battery of six cells with a capacity of 162 ampere-hours.

The activities of Department C, which apart from a single room in the garret story, is also located on the second floor, mainly comprise the investigation of gaseous, liquid and solid fuel, determinations of thermal values, all sorts of water and air tests, testing of building materials, mortar, etc. The gas analysis room has only a single outside wall with a window facing the north, and is protected as far as possible against variations in temperature. The room set apart for bacteriological research includes an electrically heated couveuse or incubator. The main laboratory room, which is connected with the offices by the weighing room, is equipped with suitable work tables, a combustion table and combustion furnaces for elementary analyses, drying stove, etc. Other special arrangements comprise a steam sterilizer and a hot-air sterilizing cabinet. In the basement is a special room for photometric work.

In Department D all sorts of lubricating oil, annealing and drilling oils as well as simple and composite greases are tested from a chemical and physical point of view. Leather, varnishes, dye stuffs, soaps, annealing materials, etc., and the pharmaceutical products intended for the Krupp hospital are likewise examined here. The oil-testing room, apart from ordinary laboratory appointments, contains two electrically heated hot-air drying stoves, which allow any temperatures of up to 250 deg. C. to be maintained. On a work table are arranged two quadruple viscosimeters. A special well-aerated dark room is used for determinations of flashing points and combustion temperatures.

Department E, which is housed in the third story of the central building, is mainly intended for testing and examining all sorts of explosive materials, powder, powder tissues and textile materials used for ammunition (silk tissues, collodium fabrics, etc.). The laboratory room adjoining the director's room comprises an isolated table equipped with gas and water mains, on which 18 extractors are installed, a wall table for nitrogen determinations and one for gas analyses. The adjoining room comprises apparatus for determining the flashing points of powder. In another room are found drying stoves for various temperatures and apparatus for stability tests. In the adjoining room are installed powder crushers and a hammer for testing the sensitiveness to impacts.

The chemico-physical testing institute comprises a chemical and a physical department. The laboratories of the former have quite similar appointments to the rooms of departments A and B of the chemical laboratory. Whereas in the latter all current analysis work is made, the chemical department of the testing institute is for special work on experimental steels, contested material and material of extraneous origin, etc. New methods of analysis adapted to the special requirements of the firm are worked out in this department.

The Physical Department

The physical department is intended for: 1—metallographic work; 2—metallurgical work; 3—mechanical tests. A store room connected with a narrow-gauge railroad serves to receive steel samples used in actual operation. The smithy comprises, in addition to the hearth furnace, a gas-heated muffle furnace and cooling tanks. The thermo-electrical pyrometers for the steel foundry are fitted up here.

The electric current used in the physical department is generated in a special transformer plant comprising two converter sets; the driven units of one are a 50-kw. direct-current shunt dynamo giving 50 to 120 volts and a

70-kva. single-phase alternate current dynamo; those of the other are a 25-kw. direct-current shunt dynamo with tension adjustable between 50 and 120 volts, and a 6-kw. direct-current booster for 100 amperes at 10 to 60 volts. The larger converter serves mainly for the melting and heating of melting baths, and the small transformer is kept in permanent operation for the electric furnaces, arc lamps and other apparatus; this unit also serves for charging the accumulator batteries.

The mechanical workshop comprises machinery for working samples and preparing testing apparatus. Samples intended for microscopic investigation are ground on two horizontal grinding benches. In the adjoining polishing room cuts intended for metallographic work are prepared on horizontally rotating disks lined with cloth, the finest grade of emery levigated in the testing institute being used for polishing and applied in a fine jet of water to the polishing disk. All rooms intended for metallographic work face the north and the quiet courtyard of the building.

A special room comprises installations for physical high precision work, such as determining specific weights, thermal expansion and heat conduction. An adjoining room is fitted up for electrical and magnetic determinations, a special apparatus serving for the testing of non-magnetic and magnetic steels respectively. In the first story is installed a photographic studio beside which there is a spacious dark room.

Cuts are generally corroded in the microscopic room, which comprises a number of microscopes with a 10 to 300-fold magnification. The institute comprises three photomicrographic apparatus, and has in the course of the year prepared 4212 polished cuts for microscopic investigation, while corroding at the same time 150 steel samples, of which 2024 photographic views were taken.

The Metallographic Department

The metallographic department also comprises a room for thermal investigations. The tables lined with slabs which are there installed carry several furnaces wound with platinum foil or Krupp wire, as well as some minor melting bath furnaces and kryptol furnaces. The thermoelements used in measuring temperatures are connected by conductors passing below the floor to the switchboards, to which are joined milli-voltmeters and recording instruments as well as two double galvanometers for taking photographic records of temperature curves and determining critical temperatures.

A large laboratory serves for metallurgical work and is controlled by a crane of three tons capacity. This comprises several gas-heated furnaces, an electrically heated annealing furnace, a muffle furnace, and a small crucible furnace.

The testing laboratory is equipped with a horizontal 100-ton universal testing machine; a vertical 50-ton traction machine for determining the elastic properties of steel; a vertical 5-ton traction and compression machine; a vertical 500-ton press for compression and inflection tests; a vertical 72-ton machine for compression and bending tests; a vertical 5-ton press; a torsion machine; two pendulum hammers; two ball presses for hardness tests; a scleroscope for the same purpose; an electrically operated alternate bending machine, and six permanent impact machines installed on a common base. All these machines are checked at suitable intervals.

The Thomson Electric Company, Cleveland, Ohio, has increased its capital stock from \$10,000 to \$50,000 to provide for increased business. Charles E. Pope, formerly mechanical engineer of the National Malleable Castings Company, Cleveland, has become connected with this company as secretary and treasurer. A. J. Thompson is president. In addition to the manufacture of the Thompson automatic safety cut-out hangers for arc lamps and large tungsten units and clusters, the company will shortly place on the market a high voltage series of cut-out hangers for street lighting.

The Garry Iron & Steel Company will shortly move its Eastern offices from 286 Fifth avenue to new quarters in the building at 521 West Twenty-third street, New York City. Two floors have been engaged for the company's metal ceiling and metal lath business.

Republic Iron & Steel Company's Earnings

Profits for Six Months Ended December 31, 1912
Show Handsome Gain on Same Period in 1911

The executive committee of the Republic Iron & Steel Company has issued its semi-annual financial statement and income report for the six months ended December 31, 1912, together with comparative statement of income for the periods ended December 31, 1911, and December 31, 1912. Hereafter the semi-annual report of the company will be issued as of June 30 of each calendar year, and the annual report will be issued as of December 31 of the calendar year in accordance with notice to stockholders dated September 20, 1912. Following is the

Comparative Statement of Income

	Six months ended Decem- ber 31, 1912	Six months ended Decem- ber 31, 1911
Net earnings from operations, after deducting charges for maintenance and repairs of plants, amounting to:		
December 31, 1912..	\$880,535.62	
December 31, 1911..	737,501.38	
Interest and dividends received, less interest paid	31,129.41	
Total profit for the six months..	\$2,601,703.72	\$1,470,812.63
Less:—		
Provision for depreciation and renewal of plants.....	251,595.65	180,694.09
Provision for exhaustion of minerals	123,726.39	122,007.97
	\$375,322.04	\$302,702.06
Net profit for the six months....	\$2,226,381.68	\$1,168,110.57
Deduct:—		
Interest on bonds and notes.....	467,295.31	369,338.26
Net profit applicable to dividend.	\$1,759,086.37	\$798,772.31
Add:—		
Surplus July 1, 1912.....	5,339,891.21	
Surplus July 1, 1911.....		5,362,445.85
	\$7,098,977.58	\$6,161,218.16
Deduct:—		
Dividends on preferred stock:		
One quarterly dividend of 1 1/4%	437,500.00	
Two quarterly dividends of 1 1/4% each		875,000.00
Net surplus carried to balance sheet	\$6,661,477.58	\$5,286,218.16

The statement for the six months period, says the report, shows that we have not only realized the largest volume of business ever recorded for a semi-annual period, but a most substantial increase has been realized in net earnings applicable to dividends; the aggregate of the current six months earnings amounting to \$1,759,086.37. The increase in net profits is due largely to improvement in market and trade conditions; substantial additions, however, were made through reduction in costs due to mechanical improvements and efficiency of operations.

Important extensions to productive capacity and further improvement to the company's general equipment are under construction, the principal items being the construction of two 60-ton open-hearth steel furnaces, four new merchant bar mills, by-product coke plant of Koppers type, daily capacity 1000 tons; the unexpended balance covering the cost of these improvements being approximately \$3,000,000. Ample funds are in hand to cover the cost of all improvements now under way.

The net working assets as of this date are \$13,875,620.97, and the financial condition of the company was never stronger. The only financing contemplated during the coming year will be that required to refund outstanding collateral notes to the aggregate amount of \$3,000,000, due November 30, 1913, which notes represent temporary financing on capital account; bonds, however, are held in the treasury for the redemption of these notes unless other provision for payment be authorized.

Unfilled orders on hand December 31, 1912, as compared with a similar period of 1911, the report states, are as follows: Finished and semi-finished products, December 31, 1912, 613,053 tons; December 31, 1911, 414,431 tons. Pig iron, December 31, 1912, 92,757 tons; December 31, 1911, 158,392 tons. In the totals of finished and semi-finished products nothing is included but fixed contracts; sliding scale contracts with periodical adjustments are excluded. The prospective improvement in value and volume of business referred to in the annual report under date of June 30, 1912, was more than realized during the period covered by this report, conditions of business today being satisfactory both in volume and value and the outlook is encouraging.

The balance sheet, as of December 31, 1912, is given below:

Balance Sheet as of December 31, 1912

Assets		
Cost of properties July 1, 1912.....	\$65,688,002.11	
Additions for the six months ended December 31, 1912	688,364.67	
	\$66,376,366.78	
Investments:		
In Potter Ore Company.....	\$401,000.00	
In other companies.....	557,412.22	958,412.22
Total capital assets.....		\$67,334,779.00
Cash deposited with trustee:		
For redemption of first mortgage 5% bonds in addition to bonds of a par value of \$2,671,000 retired in terms of the trust deed, per contra		934.63
Inventory of manufactured products, material and supplies on hand at or below cost.....	\$6,970,038.96	
Ore contract payments represented by ore at docks.....	537,823.46	
Accounts and bills receivable after deducting reserve for bad and doubtful accounts	5,407,898.72	
Cash	3,841,500.66	
Total current assets.....		16,757,261.80
Deferred charges to operations:		
Expenditure for stripping at mines, advanced royalties, etc., chargeable to future operations.....		812,459.82
Total		\$84,905,435.25
Liabilities		
Common stock—273,520 shares.....	\$27,352,000.00	
Less—In treasury	161,000.00	\$27,191,000.00
Preferred stock—250,000 shares..		25,000,000.00
Total capital stock outstanding....		\$52,191,000.00
First mortgage 5% bonds.....	\$10,000,000.00	
Deduct—Deposited with trustee and canceled	2,671,000.00	
	\$7,329,000.00	
Less:		
Deposited with trustee of the 10-30 year 5% sinking fund bonds in exchange for bonds of that issue	\$6,206,000.00	
Bonds purchased and held in treasury.....	156,000.00	6,362,000.00
Balance outstanding		967,000.00
10-30 year 5% sinking fund mortgage bonds issued.....	\$17,572,000.00	
Less:		
Treasury bonds pledged	\$3,583,000.00	
Purchased for sinking fund	684,000.00	4,267,000.00
		13,305,000.00
Potter Ore Company bonds:		
\$608,000 outstanding first mortgage 5% bonds guaranteed jointly with Tennessee Coal, Iron & Railroad Company, less that company's proportion		304,000.00
Bonds and notes outstanding on the Martin & Palos Coke Works properties		446,191.21
Collateral notes: Due November 24, 1913		3,000,000.00
Funds:		
For exhaustion of minerals and mining equipment	\$1,731,836.91	
For depreciation and renewal of plants	1,953,086.73	
For refining furnaces.....	403,465.65	
For fire and accident insurance.....	399,177.73	
For contingencies	100,084.62	4,587,651.64
Dividend warrants: Payable in equal annual installments from October 1, 1913, to 1915, inclusive.....		561,474.00
Current liabilities:		
Accounts payable	\$1,823,261.97	
Ore contract balances representing cash received in excess of the value of ore shipped to customers	246,339.66	
Taxes accrued	192,620.44	
Interest accrued	179,173.01	
Dividends payable:		
1 1/4% on preferred stock, payable January 1, 1913.....	\$437,500.00	
Unclaimed dividends.....	2,745.75	440,245.75
Total current liabilities.....		2,881,640.81
Surplus: December 31, 1912.....		6,661,477.58
Total		\$84,905,435.25

Abendroth Brothers, whose works and general offices are at Port Chester, N. Y., have closed their store on Beekman street, occupied for a number of years, and have opened a store and office at 27 West Forty-second street, New York City. Howard T. Gates will be in charge of the business at that point.

Dual Wheel System for Motor Trucks

The Bogey Truck Principle Applied to Rear Wheels of Commercial Vehicles

There was exhibited at the recent New York motor truck show a truck equipped with a new rear axle constructed upon the bogey truck principle. The vehicle was brought out by the Dual Wheel Company, New York City, and consisted of a standard 5-ton type No. 2 Mack truck, to which the new rear axle construction had been applied and which is commercially known as Dow Dual Wheels. The truck was equipped with a passenger body and used to carry passengers between the two truck shows which were running simultaneously at Madison Square Garden and the Grand Central Palace.

In the dual wheel system, four wheels are used in the rear instead of two, the wheels being mounted on the ends of two compensating levers, free to oscillate about

Each pair of wheels is connected together by a driving chain engaging sprockets on each wheel. In order to adjust this intermediate chain, the rear wheel on each side is mounted on a stub axle provided with an eccentric portion rotatable in the housing of the compensating lever, provided with means for locking it in any position. This arrangement is shown in the drawing. On the front wheel of each pair is also mounted an additional sprocket engaging with a chain from the sprocket on the jack shaft, from which power is conveyed to all four wheels. It is pointed out also that the independent driving of four wheels, each carrying one-quarter of the load, located at different points on a road bed, gives increased traction over two wheels similarly driven, and as different tractive conditions are likely to exist at the four points the differential is not as likely to spin the wheels on one side when a slippery spot is encountered. As the service brake is mounted on the jack shaft, all four wheels respond to the action of this brake, and as the emergency brake is mount-



The Dow Dual Wheels Applied to a Mack Truck, Showing in the Smaller View How They Act in Meeting an Abrupt Change in Level

their centers upon the ends of the main rear axle of the vehicle upon which the load is carried. In practically all heavy trucks as used to-day the best practice has required the use of twin tires on each rear wheel. In the dual wheel system no more tires are used, but each one of these tires is mounted on a separate wheel, which is free to follow the contour of the ground, and in consequence, to raise and lower the main load carrying axle but one-half the amount of the obstacle over which the wheel rides, or of one-half the depression into which it may fall. It has been demonstrated that on roads of extreme irregularity the vertical displacements of the load carrying axle is on an average considerably less than one-half of that which would follow if the rear axle were equipped in the ordinary manner. With the vertical displacement of the axle one-half that of the wheel its vertical velocity is reduced one-half, and in consequence the energy resulting from the blow upon the wheel is reduced four times, leaving but 25 per cent of the energy of the blow to be transmitted to the spring, and thence to the chassis.

Great economy of power is claimed from the fact that the whole chassis with its load is subjected to less vertical movement and vibration. The point is made also that in climbing out of a hole with dual wheels, the horse power required is only one-half what it would be with ordinary wheels, in that the rise from the lower to the higher plane is done in twice the time.

ed on the rear wheel, and in turn brakes on the front wheel through the medium of the chain, all four wheels are controlled when either brake is applied.

In applying the dual wheels to a motor truck, only slight changes appear to be required from the ordinary construction. The front wheels of the system have their centers in the same position occupied by the original rear axle, so that little or no change is made in the radius rod, driving chain or sprocket. The springs, however, are moved back $12\frac{1}{2}$ in. where 36-in. wheels are used, this being one-half the distance between the centers of the wheels on each side. Where larger wheels are used this center distance will be somewhat increased, but only sufficiently to provide suitable clearance between the tires of the rear wheels and the hubs of the forward ones. The arrangement of the wheels, overlapping, with the centers as close together as possible, enables them to follow nearly the same track when the vehicle turns upon its minimum radius. Although they do not trail exactly alike, this difference is provided for by an extremely slight distortion of the rubber of the tires, and hence no sliding of either wheel takes place, as the vehicle rounds the maximum curve. Proof of this is claimed from the fact that when pushed upon a floor the vehicle requires no more power to push it around the sharpest curve than it does on the straightaway. If the rear wheels were set at greater distances apart, it would be necessary to steer the rear wheels in conjunction with the front ones, and

complication would follow in designing the driving mechanism, which would have to be sufficiently universal as to drive these wheels at various obliquities to one another. By mounting the wheels in the manner followed, a chain or gear drive between each pair of rear wheels is practically, as the wheels are always parallel.

From a practical standpoint of construction, it is of importance that the use of dual wheels does not increase the extreme distance over the hub caps beyond that which exists in the present construction. In the Mack truck used as a demonstrating vehicle, the tread, which is reckoned from a point half way between the tires on each side, is 70 in., as against 71 in. in the ordinary Mack truck of this size. Important economies in the matter of tires are claimed for the new wheels, as they divide the intensity of pressure on the tire by two and the cutting action due to weight and momentum is therefore reduced. Tests have demonstrated that skidding appears to be practically eliminated when a vehicle is equipped with the new arrangement. Inasmuch as four points of surface must side slip over the ground, some of them are likely to engage surfaces which will obviate side slipping.

The peculiar design of the emergency brake connections follows from the fact that unusual problems were encountered. The emergency brake drum *a* is mounted on the rear wheel, and the brake anchor *b* instead of being squared to the shaft, as is ordinarily the case, is provided with a round hole and is rotatable on the rear stub axle *c*. The brake anchor is in turn prevented from rotating by the stud *d* in the end of the compensating lever, which stud projects into the square block *e* which is slidable in the slot *f* of the brake anchor *b*. Therefore, when the eccentric is revolved to adjust the chain, the brake anchor turns about this stud *d* which remains at rest. The internal brake band is expanded in the ordinary manner by the cam *g* through the operation of the curved brake lever *h* whose operating end *i* to which the brake rod is attached is located in line with the stud *d* just mentioned. In consequence of this, no movement of the point *i* follows when the intermediate chain is adjusted.

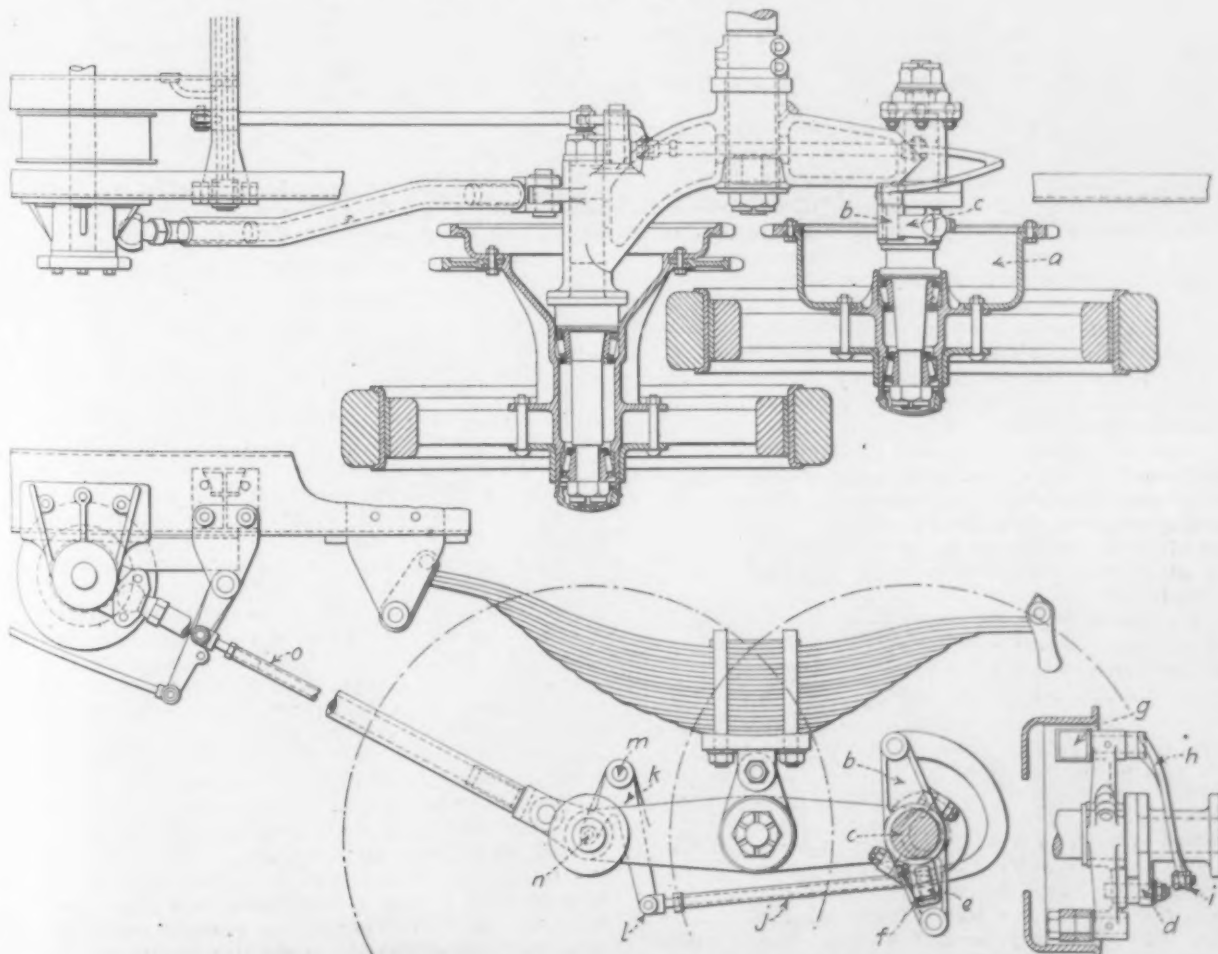
Attached to the end of the lever *h* is the brake rod *j*

attached at its further end to the bell crank lever *k* at the end *l*. This bell crank is centered upon a lug projecting upwards from the compensating lever on the pin *m*. The center line of the other end of the bell crank *n* to which the brake rod *o* is attached, coincides with the center line of the axle of the forward wheel. If any motion of the rear wheel takes place, the system will turn about the point *n* and therefore this point will always remain at rest relative to the radius rod, regardless of what oscillations of the compensating lever may take place.

The brake rod *o* is further carried in line with the radius rod to a point sufficiently close to the center about which the radius rod turns, as to afford a point which is at rest, regardless of any oscillations which may occur when the wheels traverse rough ground or fall into deep depressions, etc.

The basic patent under which the Dual Wheel Company is operating was granted to Henry B. Molesworth and Charles Edgar Masterman of London, England, on December 29, 1908. This patent was subsequently assigned to Alexander Dow, M. E., New York City, who designed the present structure to meet the conditions of American roads. In the original Molesworth vehicle, the steering of the rear wheels was provided and only one pair were driven. This necessitated a heavy compensating lever and also was open to other objections. In the new wheel the compensating lever is short and great strength is coupled with light weight. In spite of the fact that a vehicle equipped with dual wheels has been run at abnormally high speeds over the roughest cobble streets, backed over curbs and the like, no wear or cutting of the rear tires has developed.

The Society for Electrical Development, organized to promote the use of electricity, as stated last week, in places where it is not used to as large an extent as is thought it should be, will hold its annual meeting May 13. A special general conference, as stated last week, is called for March 4 and 5, in the Engineering Societies Building, New York City.



Plan and Elevation of the Wheel Mounting, Showing Details of Construction of the Dow Dual Wheel System

The Effect of Intellectual Habits*

Supplementing Last Week's Article: "Larger Demands on the Industrial Engineer"

BY JOHN CALDER.

The followers of the intellectual life, whatever their professional relations to science, have a steadfast love for the precious things which cannot be computed nor reckoned nor measured. It is in fact an unfailling measure of culture to note in any company of people with whom you may be cast for some time, after the ordinary conventionalities of conversation have been dispensed with, the extent to which each individual naturally talks about things and persons or ideas and principles. Almost invariably the man who has left culture out of sight clings instinctively in his leisure to the concrete and the measurable which form his little world and exclude all higher enthusiasm.

It was a college graduate with his commencement well behind him who, after being offered in vain conversational openings in art, music, the drama, sport, sociology and the weather turned to his lady companion and said encouragingly, "Try me on leather, that's my line." There are some people who believe that intellectual culture does not make men happier or better, and that the conscience and moral faculties are set apart from merely mental attributes. But surely none of us will accept such a false and narrow view of life.

Unless our colleges are foolish and expensive luxuries; unless civilization is worthless; unless the centuries that have witnessed the upward strife of humanity have been wasted; unless the savage chattering incantations to his fetich and magnifying his totem is a nobler product of our race than a Milton or an Emerson, then heart and mind, morality and education, do go together in true and loyal companionship.

The college and the school can give merely the apparatus of culture and a little practice with it. They should do that well, but they cannot reasonably be expected to do anything more. The human material on which they work is not yet ready for the mold of form and the choice of vocation which settle later on a man's opportunities for self-culture. Still, if when we graduate in the school of life, we allow these intellectual weapons with which we were furnished to grow rusty through disuse and find ourselves and others uninterested and uninteresting in regard to the best things and in social intercourse of a high order, we have ourselves, not our schoolmasters, to blame.

Influence of Intercourse and Books

In the intellectual life we have friendships of inestimable value; friendships that are a rest to our bodies and a solace to our souls. Some of these come through frequenting the society of the like-minded, and the company we keep will settle many things which we would feign believe are still in our own control. Our voiced opinions on many topics may be worlds apart, but provided we really hold these opinions by an intellectual process, our very differences lend zest to intercourse and increase mutual respect.

After all, however, we bring to each other's society a great company of invisible friends whose acquaintances we have made through the instrumentality of books. Here even in this western land, in the "New World," the worthies of every age come to our homes, travel with us on distant journeys and abide with us wherever our lot may be cast.

It was certainly no leader of the intellectual life, though a science graduate, who in listing a few books which he had inherited, made these two entries:

Mill—On Logic.
Ditto—On the Floss.

Nor is it surprising that the undergraduate who defined Nebuchadnezzar as "a prophet noted for his foretellings" should also be found laboring under a deep conviction that "Sodom and Gomorrah were man and wife."

These examples might be greatly multiplied for the ill-furnished mind of the average technician is a subject of frequent comment and one of the barriers to his executive advancement. Apart from largely influencing professional usefulness, intellectual acuteness and power of expression,

*From a lecture delivered last month before Stevens Institute of Technology, Hoboken, N. J.

the winning of a real companionship with the great books has special personal value. For the smaller the orbit in which we are compelled to move, the more contracted the scale of our daily relations, the more valuable, the more needful and the more accessible are those friendships of history which, if not begun through self-denials in student and early professional years, are lost forever to the majority of business men.

Summary of Personal Gains

Let us summarize some of the advantages accruing to the man who pays early attention to the feeding and development of his mind.

1.—Out of the earnest pursuit of the intellectual life there will spring the all-round man, that scarce commodity in the executive field. By this I do not mean the superficial smatterer who knows something about everything and much about nothing.

2.—There will appear the conviction that there is no good time "coming" intellectually for any one of us. It is here already, if it is to be had at all.

3.—It will develop the man who looks upon it as his choice possession, who makes provision for feeding his mind in his daily programme and who will brook no neglect of it or the setting up of rival claims for this little corner of his life.

4.—The sane pursuer of the intellectual life will not sacrifice to the service of a single dominating interest, even a mental interest, his breadth of outlook, the zest and range of his intellectual curiosity, his eagerness to know and assimilate the best that has even been and is being thought, written and said about all the things which have enriched human life.

5.—Another advantage gained from this life of culture is the avoidance of the dogmatic temper. Dogmas are not confined to religion, science and philosophy; even business abounds with them. To intellectually assent to a dogma is one thing, but to carry on the operations of the mind in a dogmatic spirit is quite another. It was the great philosopher Lessing who declared that if the Almighty offered him the choice between the knowledge of all truth and the impulse to seek the truth, he would reverently choose the second as the greater boon.

These then are the fruits of the intellectual life; fruits which aid the professional man to success and develop winning and helpful personality: To be open-minded; to struggle against preconceptions of ideas and people; to hold such in due subjection and to be ready to correct imperfect estimates of things and of character; to keep the avenues of the mind free and unblocked; to take pains that the scales of judgment shall always be even and fair; to welcome every new truth when it has proved its title despite any havoc it may make of old and cherished beliefs.

Social Influence of Intellectual Habits

These, no doubt, sound like commonplace qualities well within every man's reach, but experience shows that in practice they are among the rarest. Yet joined to ability and industry, they will go a long way toward solving the problems presented by the human factors in business which we have been studying. These problems, as we have seen, call for sympathy and action based on a true understanding, and the genuine intellectual temper is not one of detachment or cold indifference as it is sometimes misrepresented. Neither has it anything in common with that chronic paralysis of the judgment which makes jellyfish of some men who seem habitually incapable in business and social life alike of choosing between the right and the wrong reason, or the better and the worse cause.

The intellectual life implies, on the contrary, an active, virile mentality equipped by proper discipline and exercise against the fallacies of the market-place, the body politic and the pedant, ever animated by the will to believe and act, but always open to the air of reason and the light of truth.

There is a growing company who earnestly believe in the saving and leavening power of the intellectual life on our western civilization, on its institutions and upon the welfare of its individual citizens. With its pursuit and development the fortunes of our science, our arts, our literature and government are indissolubly linked and we look for leaders to the colleges where young men are taught to reflect. But they must also be touched to fine issues and the centers and shrines of the most potent in-

fluence the world has ever felt are not its seats of commerce and its capitals. From the shores of Galilee, the banks of Avon and the leafy lanes of Concord there still issue greater forces than proceed from our largest modern cities. We may live and rest in this assured faith that whoever may seem to rule in this nation, the Thinker is, and always will be, our Master.

The Wholesaler of Steel Products*

His Stable Position—Early Promise of General Acceptance of Contract Obligations

BY JAMES A. FARRELL

The wholesale merchant is an essential component of our commercial system. The importance of his relationship to the effective conduct of trade has been generally recognized. In some lines of trade it has been thought necessary to limit the scope of the distributor and deal more directly with consumers and, while theoretically this might be considered evolutionary and along the lines of efficiency in marketing products, yet, in most instances, it involves greater cost of distribution. In all of his relations with the consumer, the jobber is a fair intermediary and occupies the dual relation of a selling agent for the manufacturer and a buying agent for the consumer and, consequently, fills an important position with respect to both.

Generally speaking, the policy of the United States Steel Corporation with regard to the wholesaler is one of recognition of his ability to distribute more widely than can the manufacturer. A large percentage of the manufactured forms of steel products produced by the corporation are distributed by the wholesale trade.

There has been considerable propaganda recently looking toward efficiency, taking up loose lengths in the chain of commerce, eradicating cumbersome methods, placing buyers and sellers in close and harmonious relations with each other. In distributing many lines of products of staple character and common use to millions of consumers, it cannot be expected that the vast majority of manufacturers can deal directly with the army of purchasers, or can market an infinite variety of products as economically as can the jobber, whose familiarity with the affairs of his customers justifies credit risks which the manufacturer would not ordinarily entertain.

The profit which the jobber charges for this service, if reasonable and fair, is a just charge for the concentration and convenience of the service rendered.

Contract Obligations

All business, to be ultimately successful, must be conducted on a basis of fair dealing to all, and, in pursuing this thought, it is of interest to note that the question which for many years has been a stumbling block between buyer and seller is in a fair way to be settled, at least so far as the iron and steel trade is concerned, in an equitable and mutually satisfactory way. I refer to contract obligations.

Contracts for future delivery of material are a means of insurance afforded to customers to provide for the future and to enable them to resell at a profit and to calculate precisely the cost of material for re-manufacture or re-delivery over a fixed period. No buyer should take out such insurance beyond his capacity to consume, and no seller should contract to supply material beyond the buyer's ability to specify nor the seller's ability to manufacture. Unforeseen conditions or circumstances may prevent the seller from providing the buyer with all of the material that he desires, or in some cases may prevent the buyer from specifying as he had contemplated. Save for these exceptional conditions, contracts should be enforced as drawn and should be drawn so as to be enforceable to the benefit alike of buyer and seller. Under such conditions, no careful buyer would overbuy and no careful manufacturer would oversell, so far as could reasonably be predetermined.

The importance of this principle is not confined to the original manufacturer, but is of equal importance to the

jobber, to the jobber's customer and so on through each intermediary stage to the final consumer.

The Proposed Uniform Sales Contract

The American Iron and Steel Institute has appointed a committee to compile a uniform sales contract, fair alike to buyers and sellers, which will recognize the obligations of each, in the hope of establishing the integrity of contract prices. It is believed that, with the co-operation of all concerned, manufacturers, jobbers and consumers, so long as neither buyer nor seller is at a disadvantage with respect to his competitors, fair treatment being observed between all alike, and the obligations of buyers and sellers clearly defined and mutually understood, it will be a source of satisfaction to the makers, jobbers and consumers that the integrity of all provisions of the contract shall be inviolable, and, saving for unavoidable causes, the contract will be executed and completed in good faith by both parties.

Smith Gas Power Plants in Demand

The Smith Gas Power Company, builder of producer gas equipment, Lexington, Ohio, reports the following recent sales, which indicate the tendency of purchasers of power plants to give careful consideration to gas power: Washington Market Company, Washington, D. C., 300-hp. producer to be used in its power plant, operating on anthracite coal; Canada Foundry Company, Toronto, 300-hp. producer, to be installed in connection with a Premier engine in Moncton, N. B.; Bruce-Macbeth Engine Company, orders for producers to be installed in connection with its engines, comprising 300 hp.; anthracite producer for the Lehigh Water Company, Easton, Pa., a 200-hp. bituminous coal producer for the Wilson Ice & Fuel Company, Wilson, N. C., and a 75-hp. anthracite producer for Horace Davis, Berlin, Md.; D. P. Smelser & Sons, New Windsor, Md., a 35-hp. producer which will be installed in connection with a Bruce-Macbeth engine.

An interesting installation is a new type of large mechanically operated producer which is being installed for the Illinois Glass Company. The gas from this producer will be used in annealing lehrs. A single unit is being installed which, on a power basis, would be rated at 2500 hp. This producer will operate on Illinois bituminous coal, and deliver clean gas under high pressure to distributing mains. The National Meter Company, New York, has placed an order for a 75-hp. anthracite producer for the Clark Estate. This will be used in connection with a Nash engine, and the power will be used for a private electric light and water works plant. A 200-hp. plant erected for the Davis Mfg. Company, Milwaukee, Wis., operates on anthracite coal, making gas used in testing small gasoline motors for automobiles and tractors. A 600-hp. bituminous coal plant just started up for the A. O. Smith Company, Milwaukee, consists of two 300-hp. units and is equipped with the builder's new type F tar extractor, operating engines furnished by the Allis-Chalmers Company. The installation of a 750-hp. plant has been completed for the American Cotton Oil Company, Guttenberg, N. J., consisting of three 250-hp. units, operating on anthracite coal. These producers were sold to the Allis-Chalmers Company, which is furnishing the entire power plant equipment. A 100-hp. plant is being installed by the Bruce-Macbeth Engine Company for Ross & Young, Detroit, which will operate on anthracite.

The company states that inquiries for producers for power purposes and to replace oil for heating furnaces are greater than ever before, and it anticipates an exceedingly good year.

The G. A. Swineford Company, manufacturer of hardware specialties and farm and garden tools, Canton, Ohio, lost a portion of its factory by fire February 8. The company states that, with the friendly assistance of its many kind manufacturing neighbors, it is again in position to continue operations in practically all departments, and expects to continue to make shipments in accordance with specifications and agreements, and, in a short time, it will have the burned building replaced and will possibly be in better position than ever to handle its business.

*From an address by the president of the United States Steel Corporation delivered February 6 in Boston at a dinner of the New England Iron and Hardware Association.

ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the

David Williams Company
239 West 39th Street New York

W. H. Taylor - *President and Treasurer*
I. A. Mekeel - *First Vice-President*
Fritz J. Frank - *Secretary*
M. C. Robbins - *General Manager*

Editors

Geo. W. Cope A. I. Findley W. W. Macon

Charles S. Baur - *Advertising Manager*

Branch Offices

Chicago: Otis Building Philadelphia: Real Estate Trust Bldg.
Pittsburgh: Park Building Cleveland: American Trust Building
Boston: Compton Building Cincinnati: Mercantile Library Bldg.

Entered at the New York Post Office as Second-class Mail Matter

Subscription price: United States and Mexico, \$5.00 per year; to Canada, \$7.50 per year; to other foreign countries, \$10.00 per year.

CONTENTS.

Sheet Steel Pipe Plant at Richmond, Cal.....	471
The Werra Aluminum Company.....	473
Use of Waste Heat of Open Hearth Furnaces.....	474
A Self-Starting Direct-Current Mine Motor.....	476
Test of a High Vacuum Condenser.....	477
High Cost of Living Is High Cost of Labor.....	478
Floor Air Inlets in Ford Motor Plant.....	482
The S. K. F. Ball Bearings.....	482
Multiple-Spindle Woodworking Drilling Machine.....	483
Death of John Fritz.....	484
The Hardening of Plates by Wetting Ore Face.....	485
Road Tests of Chrome-Vanadium Wheels.....	485
The Capacity of Metal Working Machines.....	486
The Scoria Process of Utilizing Flue Dust.....	488
American Iron & Steel Mfg. Company's Report.....	489
Fuel Oil in the Foundry Cupola.....	489
The J. G. Brill Company's Year.....	489
The Krupp Steel Works Laboratories.....	490
Republic Iron & Steel Company's Earnings.....	493
Dual Wheel System for Motor Trucks.....	494
The Effect of Intellectual Habits.....	496
The Wholesaler of Steel Products.....	497
Smith Gas Power Plants in Demand.....	497
Legislation Not the Cure for High Costs.....	498
New Processes Promote Market Stability.....	498
Liability Insurance in Ohio.....	499
The Unfinished Alabama Wire Sale.....	500
Providing for the Industrial Motor Truck.....	500
Workmen's Compensation in New York.....	500
Wisconsin Labor Legislation.....	501
Machine Tools Legally Defined.....	501
Income Tax and Tariff Duties.....	501
Mutual Liability Insurance in Milwaukee.....	501
Merger of Mining Societies Proposed.....	501
Iron and Metal Markets.....	502
Personal.....	515
Obituary.....	515
The Southern Wheel Company.....	515
Pittsburgh and Vicinity Business Notes.....	516
American Rolling Mill Company's Salesmen.....	516
The Prospective Tin Plate Consolidation.....	516
The Rogers-Brown "Movies" Shown in New York.....	516
Algoma Steel Company Extensions.....	516
American Institute of Mining Engineers.....	517
American Engineers for Australian Steel Plant.....	517
Steel Corporation Extension.....	517
The Elizabeth Industrial Exposition.....	517
The Machinery Markets.....	518
Trade Publications.....	526

Legislation Not the Cure for High Costs

The article by "Manager" on other pages of this issue brings out in relief some phases of the high cost of living problem on which manufacturers have pondered much of late. In addition it gives the real significance of factors in the problem to which those whose cure-all is legislation have given little heed. It has been said ever since the panic, and with tire-some iteration, that the fundamentals of industry and business are sound. There are some reasons for thinking that in so saying a good deal too much has been taken for granted. It would be more nearly correct to say that what has been wrought out by leaders in industry and trade in the past five years has been done in spite of an unbroken succession of question marks. There has been no time since the panic when business forecast has not had to deal with some over-hanging uncertainty of a governmental nature—executive, legislative or judicial—which must needs be out of the way before business men could breathe freely.

There is a widespread belief that economic conditions are to be affected in an important way by coming national legislation. That is a leading factor in the present situation. Another is the certainty that the reductions in living cost now expected from legislation will not be realized—unless by a blow to all values, which nobody wants to see. What shape the popular disappointment in this regard will take is a development for future campaigns. The real problem, as is well indicated in the contribution we have referred to, is that of increasing the total output of the great industrial machine and of reducing, rather than steadily increasing, the unit cost. There is no pot of gold into which hands can be thrust, when higher wages are demanded—except as it is created by increased effectiveness of the individual producer. That apparently is not at all in the dream of the politician-economists who would legislate us out of all our troubles.

New Processes Promote Market Stability

A definite contribution to stability in the iron and steel markets is furnished by the development of certain processes in manufacture. Of most striking interest at this time is the fact that the general, though slight, decline in pig iron prices since the first of the year has not been reflected in any softening in steel prices. It is the change in the process of manufacture, whereby direct furnace metal is used almost exclusively in steel making, that makes a change in the market price of pig iron of only remotely sentimental interest in the fixing of steel prices. Of course a great deal of integration has occurred in the steel industry, simply because producers desired to place under one ownership the manufacture of both pig iron and steel, but it is a fact that the more economical production of steel by direct metal has retarded new construction in detached operations, whether of blast furnaces on the one hand or of steel works on the other.

Were there at the present time a large merchant blast furnace capacity dependent for its activity upon sales to the steel mills, it is probable that pig iron prices would have declined more than they have, for the immediate cause of the softening in pig iron has been the change in attitude of buyers, from buying a considerable distance ahead to waiting until their

delivers are completed. If a large tonnage were thus involved, the change of front in buyers would in all probability have resulted in a more impressive change in prices. But as matters stand, the relatively small tonnage of merchant pig iron which the producers expect to sell to steel works is supported, and we have steel making pig iron relatively much firmer than foundry iron.

Integration as between steel making and steel finishing is in part a product of changes in processes. Fifteen or twenty years ago the 4 x 4-in. steel billet was regarded as having been one of the great inventions in the development of steel making, and a strictly American invention, for American steel works engineers expressed the view that steel works abroad were trammelled in their operations because they had not learned how handy the 4-in. square billet was. Today a much smaller proportion of the total steel rolled flows through the 4-in. billet than was the case 20 years ago, and the change has made it commercially desirable to link up billet rolling with finishing, which has been one important moving force in integration. That integration has greatly helped to steady the market. In 1899 there were many steel works depending for their activity largely upon the sale of billets, and many finishing mills were regularly drawing billets from the market. Prices of finished products were then controlled quite directly by the cost of billets, and billets advanced spectacularly, partly through the supply being curtailed because the interchangeable rail and billet mills had sold such large tonnages of rails, and finished materials then advanced with billets. Today there is a dead line. Finished steel products do not advance because billets have advanced; but were a large part of the finished steel of the country made from purchased billets the market pace of finished steel would have to be set largely in conformity with the billet market.

Were the major part of the country's pig iron produced from purchased coke, the recent rise in coke prices would have had larger consequences, for pig iron would have directly reflected the large advance and steel products in turn would have been affected. As it is, the book values of coke, pig iron, etc., in integrated concerns which make the bulk of the finished steel product of the country have not reflected market prices at all, and prices to ultimate consumers of steel products have been relatively steady. To this steadiness changes in manufacturing processes in the past 20 years have contributed quite largely.

Liability Insurance in Ohio

Believing that lower insurance rates can be secured through the competition of the liability companies, employers of labor in Ohio are making a vigorous fight in the State Legislature to prevent the passage of a workmen's compensation law that will give the State a monopoly in workmen's insurance. Soon after the Legislature convened, an insurance measure, known as the Green bill, was introduced to amend in several important particulars the present Ohio workmen's compensation law, which went into effect last March and which has some features that suited neither employers nor employees. One provision makes it voluntary with an employer whether he pays into the State insurance fund and comes under the provision of the law. An amendment to the State constitution adopted last November gives the Legislature authority to pass a com-

pulsory compensation law, and a compulsory clause is the most important change in the pending bill which has finally been recommended for passage by the Senate Committee on Labor.

The Green bill makes it compulsory for employers of five or more workmen either to contribute to the State insurance fund, carry their own insurance or form mutual insurance associations. If employers carry their own insurance, they are to be required to furnish the State with sufficient bond to insure the payment of damage claims of workmen. The State is to have general supervision over employers who do not elect to go under the State law, and such employers must pay into the State insurance fund 10 per cent. of the amount they would be required to pay if they were operating under the law. This 10 per cent. charge is vigorously opposed by employers. If an employer pays his own damage claims directly, or through a mutual association, these payments must equal those allowed under the law for similar disabilities. The bill makes it optional with employers of less than five men whether they go under the law. Under it also, the employer would be required to pay the entire premium instead of 90 per cent., as specified by the present statute. This change was made because only about 50 out of 1000 employers who have subscribed to the State insurance fund under the present law have required their employees to pay their 10 per cent. of the premiums.

Another important change proposed is a clause providing payments of a definite amount for a certain permanent disability, this amount being two-thirds of the workmen's wages for a certain stated period, the period varying according to the nature of the disability. Under the present law the State Liability Board of Awards is given authority, with certain limitations, to fix the amount of award for each case of injury. Another proposed change makes the law apply to all employees of the State and its various political subdivisions.

Next to its monopolistic feature, the most serious objection to the law on the part of employers is a clause that permits a workman, under certain conditions, to bring suit if he is not satisfied with the award of the State board, but does not allow the employer to appeal to the courts if dissatisfied. Employers want the bill amended so that injured workmen must abide by the award, thus eliminating the possibility of civil suits for damages.

The principal contention raised by employers is that the law should not create what would be practically a State monopoly by shutting out the competition of the liability companies. The indications are that the employers are conducting a losing fight in this, but they propose to continue their efforts as long as there is any hope of gaining their point. The provisions allowing employers to carry their own insurance and to form mutual organizations were inserted in the bill after it was originally prepared as a concession to employers, especially to those who already have insurance organizations of their own. They insist that the Legislature allow them the benefits of competition in fixing rates that would be afforded by liability companies.

Employers maintain that the proposed law will put the State Liability Board of Awards in absolute control of the situation as regards rates, and that the present method of fixing rates is unjust. Under the present system the rate is fixed for a certain minimum number of accidents, and employers who have fewer

than the minimum number are not given the benefit of lower rates. It is contended that the inevitable tendency of State administration of insurance is to measure all employers by the same yard stick and lump the good, bad and indifferent together in one general average of badness; that efforts are not made to study the peculiar characteristics and conditions of each individual employer's plant and to base his rate on any adequate knowledge of the conditions there existing, and that no such attempt can possibly be made by a State board. It is claimed that the effect of the present system of fixing rates is to penalize employers who have succeeded in reducing their number of accidents below the State board's minimum and to put a premium on carelessness and indifference on the part of a large class of employers in the less hazardous industries. Ohio employers contend that in order to get careful, accurate and scientific adjustment of the rates to the risk, with adequate incentive to employers to reduce their risk, they must have the competition of privately owned liability companies. With competition, they would have a choice between State and liability company insurance. Without competition, they would be at the mercy of rates fixed by the State, however unjust those rates might be in some cases.

The Unfinished Alabama Wire Mill

The Chamber of Commerce of Birmingham, Ala., has sent to Chairman E. H. Gary of the United States Steel Corporation a set of dignified and impressive resolutions requesting the corporation to proceed to equip the unfinished wire mill of the American Steel & Wire Company at Corey, Ala., and put it in operation "without unnecessary delay." The resolutions state that for some time there has been a steadily growing sense of disappointment since the work of construction was stopped on the wire mill, which in the minds of some has culminated in distrust of the future by reason of the announcement of the Steel Corporation that it proposed to spend many millions in Canada in building a steel plant.

We are not aware of the policy of the Steel Corporation with regard to this matter and have no authority whatever to speak for it. Nevertheless, it appears to us that, in view of the fact that a Birmingham Member of Congress, Mr. Underwood, proposed in the spring of 1911 to put wire nails, wire staples and barb wire and other wire fencing on the free list, and incorporated the same provision in his proposed revision of the metal schedule in January, 1912, it might be well first for the Birmingham Chamber of Commerce to induce Mr. Underwood to change his views and retain an adequate duty on these commodities in the forthcoming revision of the tariff. Some assurance would then be given that the new wire mill might not prove an unprofitable investment.

Providing for the Industrial Motor Truck

In building a new factory it is not uncommon to take account of future extensions in floor space and of additions to equipment. But what is ordinary foresight when so applied contrasts with the helplessly speculative attitude of the builder of new plant toward the possibilities of radically new machines, new methods or new products. Those who bought metal working machinery immediately before the introduction of high speed steel know the distinction.

Factory construction of corrugated siding or other inexpensively replaced material, which was in vogue some years ago, was an attempt to compromise with the difficulty of anticipating future expansion. Then came the era of largely increased production per machine or per unit of space, and the argument against permanent construction and in favor of the temporary lost much of its force.

It is interesting to note in this connection a late influence on works planning, which has become of considerable importance, and that is the laying out of a plant more or less around the shop motor truck. The adaptability of the self-propelled vehicle to speedy transportation in crowded quarters has made it popular, yet at that there are instances where it cannot be used because the builders of the plant did not apprehend that such means of factory intercommunication would be realized. The shape of the buildings, the relative elevations of different floors and even the aisle space preclude their use. The industrial railroad has had much to do with determining the arrangement of industrial establishments and the small motor truck is exerting a similar influence. Each will hold its own, with their fields naturally overlapping more or less, but the main point is that either or both may better be considered before than after construction is completed.

Workmen's Compensation in New York

Manufacturers in New York State have taken a lively interest in the hearings appointed for this week in the Senate chamber at Albany on pending bills providing for workmen's accident compensation. The so-called Murtaugh-Jackson bill, favored by the New York Federation of Labor, is particularly objectionable to employers for its apparent effort to create a State monopoly in insurance. It provides for a State fund to meet claims for industrial accidents, and the opposition of the manufacturers is based on the same reasons that are being urged against the pending Green bill in Ohio. It is proposed to raise the New York State fund by assessments upon employers who come within the provisions of the act and this fund will be administered by State officials. Not all employments are included by the bill, but chiefly those in which the work is done in factories or in some form of construction. The compensation provisions of the bill are excessive in comparison with those of New Jersey, Massachusetts and other States. The employer has the right to elect whether he will come under the act, but if he decides not to do so he will be liable for all accidents, the amount of damages to be determined by a jury. It is claimed that not more than 100,000 workers will come within the provisions of the bill. The awards of the board which is to administer the insurance fund are not subject to review, so that employers have no recourse, but if the board refuses to allow compensation the workman may still go to the courts.

The alternative measure under discussion at Albany, known as the Foley-Walker bill covers all employees of the State except purely domestic servants, farm laborers, casual employees, and those who take the work to their own homes away from the employer's shop. It includes all the employees of municipal corporations and of the State and of all the political subdivisions therein. The bill provides for free competition regarding the manner in which the employer shall insure his employees. He may either carry the insurance in a mutual company or in a stock liability company, or he may carry it himself if he has sufficient ability to do so, or he may file sufficient security with the Superintendent of Insurance to permit him to carry his own insurance, or he may contribute to a State fund under the administration of the Insurance Department.

A great objection to the Murtaugh-Jackson bill is that it makes the same rate of premium for insurance apply equally to all employers in any given industry, thus offering a bonus to the careless and indifferent employer, whose

failure to provide safety appliances puts the cost of his negligence on other employers who may have made large outlays to protect their employees. The strong feature of the Foley-Walker bill is that it operates constantly for the prevention of industrial accidents and provides certain compensation for the workman in case of injury.

Wisconsin Labor Legislation

Labor legislation again forms one of the principal lines of endeavor of the 1913 Wisconsin Legislature, now in session at Madison. After a trial of 18 months, the Industrial Commission has made several important recommendations for changes in the workmen's compensation law, which are now being considered. The proposed changes are:

Abrogation of the common law defense of contributory negligence, except in cases where less than four persons are employed.

Removing the optional feature of employers' electing to come within or stay without the law, and bringing all employers under the law automatically, except when protested.

Fixing specific indemnities for the loss of a hand, a leg, an eye, etc., and compensating permanent disability by payment of a sum equal to one and one-half times the death benefit in the specific case.

Fixing penalty of 15 per cent. extra for employers who fail to provide safety appliances, and making similar deductions for negligent employees.

Increasing the compensation of railroad employees because of the extraordinary hazard of the occupation as compared with usual occupations.

A new field of labor legislation has been entered by Wisconsin through the introduction of a "minimum wage bill." A feature of this proposed law is that it does not establish a forced or arbitrary minimum wage, but leaves the determination of this to a commission of arbitration, which shall inquire into the particular conditions. The aim of the bill is that "every wage paid or agreed to be paid by any employer to any female or minor employee, except as otherwise provided, shall be not less than a living wage." The bill defines a living wage as "Compensation for labor sufficient to enable the employee receiving it to maintain himself or herself under conditions consistent with his or her welfare." The Industrial Commission of Wisconsin will administer the law. Every person employing three or more females or minors must register with the commission. Employees are protected from any discrimination which may be practiced by an employer because of giving information concerning his or her employment or living conditions to the commission.

Machine Tools Legally Defined

The United States Court of Custom Appeals has handed down a decision reiterating a former decision as to what constitutes "machine tools" under the tariff act. The merchandise involved in the case consists of a bench lathe with an iron stand and treadle. When in use the machine is operated exclusively by force applied to the treadle by the foot of the operator. The collector assessed the importation at 45 per cent. ad valorem as a manufacture of metal under the provisions of paragraph 199 of the tariff act of 1909. The importers protested against that classification, claiming assessment of the article at 30 per cent. ad valorem as a machine tool within the terms of paragraph 197 of the act. The Board of General Appraisers sustained the importers and the Government appealed. In its decision the court says:

"In the case of *Sears, Roebuck & Co. vs. United States*, this court held that the term 'machine tool' 'always connotes the application of some kind of power to an implement or tool for its use and operation other than hand power alone,' and in another case it was held that 'power other than the hand of the operator means other motive power than that of the operator used to drive, propel, or operate the machine, among which is steam or water power. The multiplication of the power of the operator by mechanical devices is not such other motive power.' These cases disposed of the issue at bar. The term 'hand power' as therein used includes foot power; and both fall within the same rule, in case the action of the operator alone furnishes the motive power for the machine. In conformity with this rule the decision of the board is reversed."

Income Tax and Tariff Duties

WASHINGTON, D. C., February 18.—Representative Hull, of Tennessee, a Democratic member of the Ways and Means Committee, has begun the drafting of an income tax bill, the proposed amendment to the Constitution providing for such a tax having been ratified by sufficient States. It is the purpose of the Ways and Means Committee to report a bill levying an income tax as a part of its plan for the revision of the tariff in the extra session of Congress, and it is the present plan to have it reported and passed by the House before any of the tariff measures are taken up. The Democratic leaders estimate that an income tax will net the Government an annual revenue of at least \$100,000,000 and that this will permit them to slash the tariff schedules even lower than in the bills which were passed by Congress and vetoed by the President. The present plan is to tax incomes of \$5,000 and over 1 per cent. per annum. In the event of the passage of the income tax bill, the present corporation excise tax will be repealed. This nets the Government about \$30,000,000 per annum.

W. L. C.

Mutual Liability Insurance in Milwaukee

The Workmen's Compensation Mutual Liability Insurance Company of Milwaukee, Wis., an organization of Milwaukee employers to represent them in the operation of the Wisconsin industrial insurance act, has formed a permanent organization by the election of the following officers: President, A. J. Lindemann; vice-presidents, Roland B. Roehr, A. E. Martin, J. W. Suetterle, E. A. Piepenbrink, Alonzo Pawling; secretary, William J. Piepenbrink; treasurer, Louis Hoffman; counsel, Julius E. Roehr; directors, Henry Wallschlaeger, Jr., Emmanuel L. Philipp, L. J. Mueller, Jr., J. W. Utley, Paul E. Mueller, W. Wjller, Jr. Offices have been established in the Majestic Building.

The principal aim of the company will be to rid the city of the professional personal injury lawyers or "ambulance chasers" and to make prompt and equitable payments of all claims for compensation against any member, as designated by the Industrial Commission. It is a local institution and will not seek membership outside of the city of Milwaukee.

Merger of Mining Societies Proposed

The Mining and Metallurgical Society of America held its annual meeting at the Engineers' Club, New York, January 14, at which Henry M. Chance, 819 Drexel Building, Philadelphia, Pa., was elected president; J. R. Finlay, 52 William street, New York, vice-president, and W. R. Ingalls, 305 Pearl street, New York, secretary and treasurer. The report of the secretary shows the total membership, January 1, 1913, to have been 234.

A plan has been made public for a union of this society and the American Institute of Mining Engineers. It was adopted by the council of the society January 14, and by the council of the institute January 23. Under its provisions the society is to become the Mining and Metallurgical Society of the American Institute of Mining Engineers, is to preserve its integrity and organization, is to continue its studies of professional and professional-political questions, through committees and otherwise, as at present, and membership in the institute is to be made a qualification for membership in itself. The plan is to be submitted to a vote of the membership of the society before it can be carried out.

The American Brass Company, Waterbury, Conn., has elected the following officers for the coming year: President, Charles F. Brooker; vice-presidents, Edward L. Frisbie, Alfred A. Cowles, Thomas B. Kent and John A. Coe, Jr.; treasurer, John P. Elton; assistant treasurer, George E. Cole; secretary, Gordon W. Burnham; assistant secretary, Franklin E. Weaver. The directors are Charles F. Brooker, James S. Elton, Alfred A. Cowles, Arthur C. James, Gordon W. Burnham, John J. Sinclair, Edward Holbrook, Edward L. Frisbie, John P. Elton, Cleveland H. Dodge, Thomas B. Kent, T. Brownell Burnham, John E. Wayland, James A. Doughty and John A. Coe, Jr.

The Iron and Metal Markets

Chicago Mills Under Pressure

Pig Iron Shipped There from Pittsburgh

Great Activity in Sheets—Mid-Winter Railroad Work Upsets Calculations

The fact that new buying in finished steel products is at a somewhat less rate than shipments from the mills is given no great significance, since steel companies look for full operation for six to eight months ahead. In the Chicago district new orders with the largest producers exceed mill output. The persistence of demand there is surprising. To help out on pig iron, shipments have been made to Chicago district steel works from the Carnegie furnaces at Pittsburgh. It is several years since the last shipment of this sort.

The difficulties of the mills in getting material to their customers are abating little if at all. Railroad work has gone on in an unparalleled way this winter and has absorbed steel which was expected to be available for other uses. Frog and switch works have been driven to meet the demands upon them. An exceptional volume of girder rail business has come up, also, some of these orders ordinarily placed in later winter months having been booked last fall.

Rail orders of the week closed by the Steel Corporation amounted to 23,000 tons, and considerable inquiry is pending, including 7000 tons for the Waterloo, Cedar Falls & Northern and 4700 tons for a Southwestern road. At Chicago 10,000 tons of tie plates are under negotiation.

Car wheel makers have done an unusual business in recent months and there is little slack capacity. A few railroads have given orders for special cast iron wheels and steel wheels have been specified to an increasing extent. The Pennsylvania Railroad has ordered 76,000 steel wheels and the N. & W. 20,000.

Plate and structural mills are making little gain on their accumulated tonnages. For the battleship Pennsylvania the Newport News yard has placed 15,000 tons of plates and shapes at Johnstown. The Passaic Valley sewer will be built of plates and 18,000 tons will go to Pittsburgh. Most of the plate mills west of the Alleghenies are pre-empted to October, having specifications up to July. In the East earlier deliveries can still be had, and shipments are made to Chicago on a 1.60c. Pittsburgh basis. Canada has been a buyer of plates at premium prices.

Recent structural contracts include 7000 tons for the 8th regiment armory, New York, taken by the Cambria Steel Company; several thousand tons to the American Bridge Company for the Duluth steel works and for extensions of the Cuyahoga works, Cleveland; 3000 tons of pipe bands, taken by the Colorado mill, and 2200 tons for the Davenport Hotel, Spokane. Considerable railroad bridge work is pending. Steel works buildings to be put up at Cleveland will mean a large fabricating contract.

No relief is in sight for the scarcity of semi-finished steel, and due to the shortage in sheet bars one tin plate plant will probably go down for repairs that otherwise would not be made until summer. Sheets are probably more active than any other form of material, the demand being far beyond expectations. Two or three large makers of tin plates report practically their entire output sold into October.

The merchant pipe trade shows some slackening and there has been sharper competition, with shading of the prices quite generally maintained in January.

The deadlock in pig iron goes on, and there are further signs of weakness in Southern iron which has sold below \$13.25 Birmingham for No. 2.

Pig iron and finished material have gone their separate ways before, and foundry buyers argue that the strong conditions in the steel trade will not prevent them from getting iron at lower prices for the second half of the year.

The market for steel-making iron has come almost to a standstill at Pittsburgh. One sale of 1500 tons of basic for March is reported at \$16.25 at Valley furnace, but the buyer is holding off on 4500 tons for the second quarter.

The December advance of coke to \$4.25 for spot was so far fictitious that its rapid decline has had no influence on other markets. As low as \$2.25 has been done for spot furnace coke in the past week.

Our British cable notes fresh weakness in the pig iron market, with increasing uneasiness over the outlook. But British steel works, like those at home, are booked far ahead, apart from those directly depending on the tin plate trade, which has been seriously upset by the Balkan war.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month and one year previous.

	Feb. 19.	Feb. 12.	Jan. 22.	Feb. 21.
Pig Iron, Per Gross Ton:	1913.	1913.	1913.	1912.
Foundry No. 2 X, Philadelphia	\$18.25	\$18.25	\$18.50	\$14.85
Foundry No. 2, Valley furnace	17.00	17.00	17.50	13.80
Foundry No. 2, S't'h'n. Cin'ti.	16.75	16.75	16.75	13.25
Foundry No. 2, Birmingham, Ala.	13.50	13.50	13.50	10.00
Foundry No. 2, furnace, Chicago*	17.25	17.25	18.00	14.00
Basic, delivered, eastern Pa....	18.00	18.00	18.00	14.25
Basic, Valley furnace.....	16.25	16.35	16.35	12.25
Bessemer, Pittsburgh.....	18.15	18.15	18.15	14.90
Malleable Bessemer, Chicago*..	17.25	17.25	18.00	14.00
Gray forge, Pittsburgh.....	17.15	17.15	17.15	13.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	16.00
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh...	28.50	28.50	28.50	20.00
Open hearth billets, Pittsburgh.	29.00	29.00	29.00	20.00
Forging billets, Pittsburgh.....	36.00	36.00	36.00	28.00
Open hearth billets, Philadelphia	32.00	32.00	32.00	22.40
Wire rods, Pittsburgh.....	30.00	30.00	30.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	16.25	16.25	16.75	15.00
Iron rails, Philadelphia.....	18.00	18.00	18.00	15.50
Car wheels, Chicago.....	16.75	16.75	16.75	13.00
Car wheels, Philadelphia.....	15.00	15.50	16.25	12.00
Heavy steel scrap, Pittsburgh..	14.00	14.25	15.00	12.00
Heavy steel scrap, Chicago.....	12.25	12.25	12.50	10.50
Heavy steel scrap, Philadelphia	12.50	13.00	14.50	11.75
Finished Iron and Steel,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.67 1/2	1.67 1/2	1.77 1/2	1.25
Iron bars, Pittsburgh.....	1.70	1.70	1.70	1.25
Iron bars, Chicago.....	1.60	1.60	1.57 1/2	1.15
Steel bars, Pittsburgh, future...	1.40	1.40	1.40	1.10
Steel bars, Pittsburgh, prompt...	1.70	1.70	1.70	1.10
Steel bars, New York, future...	1.56	1.56	1.56	1.26
Steel bars, New York, prompt...	1.86	1.86	1.86	1.26
Tank plates, Pittsburgh, future	1.45	1.45	1.50	1.10
Tank plates, Pittsburgh, prompt	1.70	1.70	1.75	1.10
Tank plates, New York, future..	1.61	1.61	1.66	1.26
Tank plates, New York, prompt	1.86	1.86	1.91	1.26
Beams, Pittsburgh, future.....	1.45	1.45	1.50	1.10
Beams, Pittsburgh, prompt.....	1.70	1.70	1.75	1.10
Beams, New York, future.....	1.61	1.61	1.66	1.26
Beams, New York, prompt.....	1.86	1.86	1.91	1.26
Angles, Pittsburgh, future.....	1.45	1.45	1.50	1.10
Angles, Pittsburgh, prompt.....	1.70	1.70	1.75	1.10
Angles, New York, future.....	1.61	1.61	1.66	1.26
Angles, New York, prompt.....	1.86	1.86	1.91	1.26
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.12 1/2
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.20
Steel hoops, Pittsburgh.....	1.60	1.60	1.60	1.25

*The average sitching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Pound to Large Buyers:	Feb. 19, 1913.	Feb. 12, 1913.	Jan. 22, 1913.	Feb. 21, 1912.
	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.35	2.35	2.35	1.85
Wire nails, Pittsburgh	1.75	1.75	1.75	1.60
Wire nails, f.o.b. Eastern mills	1.80	1.80	1.75	...
Cut nails, Pittsburgh	1.70	1.70	1.70	1.55
Fence wire, ann'd, 0 to 9, Pgh.	1.55	1.55	1.55	1.40
Barb wire, galv., Pittsburgh	2.15	2.15	2.15	1.90

Coke, Connellsville, Per Net Ton, at Oven:	Feb. 19, 1913.	Feb. 12, 1913.	Jan. 22, 1913.	Feb. 21, 1912.
Furnace coke, prompt shipment	\$2.25	\$2.50	\$3.75	\$1.75
Furnace coke, future delivery	2.50	2.50	3.25	1.80
Pomery coke, prompt shipment	3.00	3.50	4.25	2.10
Pomery coke, future delivery	3.00	3.50	3.60	2.25

Metals, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	15.00	16.00	16.37½	14.50
Electrolytic copper, New York	14.87½	15.75	16.12½	14.37½
Spelter, St. Louis	6.20	6.35	6.95	6.55
Spelter, New York	6.35	6.50	7.10	6.70
Lead, St. Louis	4.20	4.20	4.20	3.95
Lead, New York	4.35	4.35	4.35	4.00
Tin, New York	49.25	49.30	50.50	42.87½
Antimony, Hallett, New York	8.75	9.00	9.25	7.37½
Tin plate, 100-lb. box, Pittsburgh	\$3.60	\$3.60	\$3.60	\$3.30

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific Coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.75c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¾ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 2	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive fire box steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. to 1.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide as per steel bar card, Sept. 1, 1909	.20 to .80
Dork beams and bulb angles	.30
Hand rail tees	.25
Cutting to length, under 3 ft., to 2 ft. inclusive	.25
Cutting to length, under 2 ft., to 1 ft. inclusive	.50
Cutting to length, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.55; galvanized, \$1.95. Galvanized barb wire, to jobbers, \$2.15; painted, \$1.75. Wire nails to jobbers, \$1.75.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Nos.	Plain Wire, per 100 lb.							
	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	\$1.70	\$1.75	\$1.80	\$1.85	\$1.95	\$2.05	\$2.15	\$2.25
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Wrought Pipe.—The following are the jobbers' car-load discounts on the Pittsburgh basing card on steel pipe (full weight) in effect from January 1, 1913; iron pipe (full weight), from October 21, 1912:

Steel.			Iron.		
Inches.	Black.	Galv.	Inches.	Black.	Galv.
¼, ¾ and ¾	73	52½	¾ and ¾	67	48
¾	77	66½	¾	66	47
¾ to 3	80	71½	¾ to 2½	70	57
				73	62

Lap Weld.			Plugged and Reamed.		
2	77	68½	1 to 1½, butt.	71	60
2½ to 6	79	70½	2, butt.	72	61
7 to 12	76	65½	1½, lap	55	44
13 to 15	53	..	1½, lap	66	55
			2, lap	67	57
			2½ to 4, lap	69	60

Butt Weld, extra strong, plain ends.			Lap Weld, extra strong, plain ends.		
¼, ¾ and ¾	68	57½	2	64	50
¾	73	66½	2½ to 4	66	55
¾ to 1½	77	70½	4½ to 6	60	54
2 to 3	78	71½	7 to 8	53	43

Butt Weld, double extra strong, plain ends.			Lap Weld, double extra strong, plain ends.		
¼	63	56½	2	56	50
¾ to 1½	66	59½	2½ to 4	61	55
2 to 2½	68	61½	4½ to 6	60	54
			7 to 8	53	43

Standard Charcoal Iron.			Lap Welded Steel.		
1½ in.	44		1½ in.	60	
1½ and 2 in.	48		2 in.	57	
2 in.	44		2½ and 3 in.	63	
2½ in.	53		3 and 3½ in.	68	
3 and 3½ in.	55		3½ to 4½ in.	70	
3½ to 4½ in.	58		5 and 6 in.	63	
Locomotive and steamship special grades bring higher prices.			7 to 13 in.	60	

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers in carloads on lap welded steel, in effect from February 1, 1913, and standard charcoal iron boiler tubes, in effect from January 1, 1913, are as follows:

Standard Charcoal Iron.			Lap Welded Steel.		
1½ in.	44		1½ in.	60	
1½ and 2 in.	48		2 in.	57	
2 in.	44		2½ and 3 in.	63	
2½ in.	53		3 and 3½ in.	68	
3 and 3½ in.	55		3½ to 4½ in.	70	
3½ to 4½ in.	58		5 and 6 in.	63	
Locomotive and steamship special grades bring higher prices.			7 to 13 in.	60	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.			Box Annealed Sheets, Cold Rolled.		
Nos.	3 to 8	9 to 10	Nos.	10 and 11	12
	1.70	1.75		2.00	2.00
	1.80	1.85		2.05	2.10
	1.85	1.95		2.15	2.20
	1.95			2.25	2.30
				2.35	2.40
				2.40	2.50

Galvanized Sheets of Black Sheet Gauge.

	Cents per lb.
Nos. 10 and 11	2.50
No. 12	2.60
Nos. 13 and 14	2.60
Nos. 15 and 16	2.75
Nos. 17 to 21	2.90
Nos. 22 and 24	3.05
Nos. 25 and 26	3.20
No. 27	3.35
No. 28	3.50
No. 29	3.65
No. 30	3.80

Pittsburgh

PITTSBURGH, PA., February 18, 1913.

Specifications for steel products are still coming in heavily, but not in such great volume as last month. There is no denying the fact that a feeling of uncertainty prevails, but with the heavy specifications still coming in and with nearly all finishing mills back in deliveries from three weeks to four months, depending on the material, there is little reason for apprehension that present conditions will not last until July 1 at least. A factor in the situation is that spring trade on seasonable lines, such as wire products, sheets, tin plate, pipe and other lines, makes it probable that there will be an increase in new demand next month or early in April. Already the wire trade is showing an increased demand, with inquiries coming in for other materials for second quarter delivery. Probably the most active item on the whole list is sheets, the new demand for which is exceptionally heavy. Specifications against contracts for tin plate are also notably large, the mills running at much greater capacity than usual at this season. The quiet conditions in pig iron and the softer tone in pig iron prices have not affected the steel market in the least, prices being as strong as ever. While coke has declined about \$1.50 a ton or more, the effect has been slight, as it was realized that \$4 a ton or higher was a fictitious price for coke and could not long be maintained. The scrap trade still drags, with no signs of early betterment in demand or prices.

Pig Iron.—The Colonial Steel Company has bought 1500 tons of basic iron for March delivery from a Valley producer at not over \$16.25 at Valley furnace, equal to \$16.85 delivered at Colona, Pa., which has a 60c. freight rate from the valleys. The company decided to defer until later its proposed purchase of 4500 tons for second quarter delivery, but states that it will need iron for second quarter, and will probably be in the market again in the near future. There is no new inquiry for Bessemer, which is strong, however, with no iron pressing on the market. Foundry and forge iron are quiet, with prices ruling fairly steady. Some small lots of Southern foundry are finding their way into this market, and one Shenango Valley interest is offering No. 2 foundry at about \$17 at furnace. We quote Bessemer iron for delivery up to July at \$17.25; basic, \$16.25; malleable Bessemer, \$17 to \$17.25; gray forge, \$16.25 to \$16.50, and No. 2 foundry, \$17 to \$17.25, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton.

Billets and Sheet Bars.—The scarcity of steel, which has been a feature of the market for nearly six months and has interfered seriously with operations of finishing mills, continues with no relief in sight. A leading maker of tin plate contemplates shutting down one of its plants and making repairs that would not be done until the summer months if a plentiful supply of steel could be had. One of the leading sheet makers at Canton, Ohio, has contracted for its supply of sheet bars over this year on a sliding scale, based on the average monthly price of Bessemer pig iron, the steel mill charging so much per ton for conversion. A local open hearth plant sold last week two small lots of sheet bars for prompt delivery at \$31, Pittsburgh, but this is above the legitimate market. There is practically no steel being offered by makers, but small lots can be had from dealers who ask heavy premiums. The steel market nominally is as follows: Bessemer billets, \$28.50 to \$29; Bessemer sheet bars, \$29 to \$29.50; open-hearth billets, \$29 to \$29.50, and open-hearth sheet bars, \$29.50 to \$30, f.o.b. mill, Pittsburgh or Youngstown. Forging billets, \$36 to \$37 and axle billets, \$34 to \$35, Pittsburgh.

Ferroalloys.—Some further lots of ferromanganese are being offered for prompt delivery at about \$64, seaboard, which is about \$1 less than asked on contracts for forward delivery. We note sales of four or five cars at this price. There is not much inquiry, as consumers are pretty well covered and are getting better deliveries than for some time. We quote 80 per cent. at \$64 for prompt and \$65 for forward delivery. Prices on ferrosilicon are firm and sales of numerous carload lots are being made at the full price of \$75, Pittsburgh. We quote 50 per cent. ferrosilicon, in lots up to 100

tons, at \$75; over 100 tons to 600 tons, \$74; over 600 tons, \$73, Pittsburgh. We quote 10 per cent. at \$24; 11 per cent., \$25; 12 per cent., \$26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferro-titanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

Wire Rods.—Consumers are well covered up to July, but some new inquiry is in the market for third quarter, one local maker having sold fairly large lots of open-hearth rods for such shipment on the basis of \$30, Pittsburgh. Consumers are specifying freely against their contracts. The market is firm. We quote Bessemer, open-hearth and chain rods at \$30, Pittsburgh, for prompt or forward delivery.

Muck Bar.—There have been no new sales and there is no inquiry. We quote best grades at nominally \$31, Pittsburgh.

Skelp.—Inquiry has quieted down, but the skelp mills are pretty well sold for the next three or four months and have little to offer for earlier than May or June delivery. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.90c., delivered at buyers' mills in the Pittsburgh district.

Steel Rails.—The Carnegie Steel Company has recently booked 15,000 to 20,000 tons of standard sections for delivery before July, and its order books are pretty well filled for the first half. The coal mining trade is very active, and this is reflected in a large demand for light rails, the Carnegie Company having received new orders and specifications in the past week for over 4000 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20-lb., 1.30; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Car Wheels.—It is understood that the Pennsylvania Railroad has practically placed an order with the local interest for nearly 70,000 steel car wheels and about 30,000 chilled cast iron wheels. The Norfolk & Western has bought about 20,000 wheels and the Baltimore & Ohio is in the market with a heavy inquiry. We quote 33-in. rolled steel wheels for freight service at \$15 to \$15.50 and 36-in. for passenger cars at \$19 to \$19.50 per wheel, f.o.b. Pittsburgh.

Structural Material.—A great deal of new work is in sight. The Cambria Steel Company took last week about 15,000 tons of shapes and plates for the Newport News Ship Building & Dry Dock Company, also about 800 tons for an extension to the Jewett, N. J., works of the National Lead Company, and the McClintic-Marshall Construction Company has taken about 900 tons for a municipal lighting plant at Cleveland. The Pittsburgh Bridge & Iron Company has taken 200 tons for a new building for the Bell Telephone Company at Erie, Pa. The report that the Aluminum Company of America is in the market for 800 tons for new buildings at New Kensington, Pa., is incorrect. The market is firm. The two local mills have their product sold ahead for the next five or six months and are booking contracts at a good rate for delivery in last half. We quote beams and channels up to 15-in. at 1.45c. to 1.50c. for delivery at convenience of the mill, which means third or fourth quarter of this year, while small lots from warehouse or other sources for delivery in three to four weeks brings 1.75c. to 2c. or higher. (Later, by Telegraph.)—The Cambria Steel Company has secured 7000 tons for the Eighth Regiment Armory Building, New York City; McClintic-Marshall Construction Company, 1050 tons for bridges for the Pittsburgh & Lake Erie Railroad; American Bridge Company, 800 tons for a new foundry building for the Otis Elevator Company, Buffalo, N. Y. The report that the American Bridge Company has taken 12,000 tons or more for the new steel plant of the Otis Steel Company, Cleveland, Ohio, is not correct, as no contracts for this plant have yet been placed.

Plates.—New inquiries for cars continue heavy, and some fair sized orders were placed in the past week. The Barney & Smith Car Company took 1000 hopper and 300 flat cars for the Atlantic Coast Line; the Louisville & Nashville has ordered 500 steel gondolas from the Mt. Vernon Car Mfg. Company; South Buffalo has placed an order for 30 steel hopper cars of a new design with the Summers Steel Car Company, which will be built at Butler, Pa., and the Norfolk & Western has contracted for 1000 hoppers and 300 steel under-frame freight cars with the Pressed Steel Car Company. Booth & Flinn, Ltd., of this city, have been awarded the contract for the Passaic Valley sewer in New Jersey, requiring upward of 18,000 tons of plates, which will probably be placed with local mills. The Baltimore & Ohio Railroad has asked bids on 100 loco-

motives, of which 60 are of the Mikado type, 30 Pacific and 10 Mallett. With orders on their books and business in sight, local plate mills are filled up to October and have actual specifications to July or later. Some mills that can make shipments in three to four weeks are able to obtain premiums of \$2 to \$4 a ton over regular prices. We quote $\frac{1}{4}$ -in. and heavier tank plate at 1.45c. Pittsburgh, for forward delivery, while for shipment in three to four weeks 1.60c. to 1.65c. is quoted for carload and larger lots, and from 1.75c. to as high as 2c. for small lots f.o.b. Pittsburgh.

Iron and Steel Bars.—It develops that the statement that the Carnegie Steel Company was entering orders for steel bars for delivery over the entire year at 1.40c. Pittsburgh, is incorrect; it is refusing to sell for delivery beyond July 1 at that price. The steel bar mills have their product pretty well sold up to July and are being importuned by jobbers and consumers to accept orders for third and fourth quarter delivery, but aside from one or two mills they are refusing such business. The steel car companies are specifying for great quantities of steel bars and other shapes, and all report that deliveries from the mills are unsatisfactory, restricting the output of cars to a considerable extent. The demand for iron bars continues quite active. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill, which would not be before third quarter, while for fairly prompt shipment 1.60c. to 1.85c. is readily paid. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt delivery. Mills charge \$1 extra per ton for twisting $\frac{1}{4}$ -in. and larger steel bars, and \$2 extra for $\frac{1}{2}$ to $\frac{3}{4}$ in.

Sheets.—The new demand for all grades of sheets continues active, and few mills have any product to spare for delivery this side of July. Jobbers have been offering the mills orders for third-quarter delivery at present prices, but they are still being turned down. A feature of the market is the heavy demand for electrical sheets, and concerns that make these have their product sold up for three or four months. Specifications are coming in actively for second-quarter delivery, one local mill booking to-day 2000 tons of flat galvanized sheets for second quarter and another reporting specifications for 5000 tons of Bessemer sheets for the same delivery. On blue annealed, most of the mills are back from six to eight weeks and on Bessemer black and galvanized from 12 to 14 weeks. We quote 1.75c. for No. 10 blue annealed; 2.35c. for No. 28 Bessemer black sheets; 3.50c. for No. 28 galvanized and 2.30c. for No. 28 tin mill black plate. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Specifications against contracts have been coming in more freely than usual so early in the year. Two or three leading makers report that they have practically their entire output sold up to October or later, and now have specifications on their books for more than 50 per cent. of the contracts. The belief continues that there will be a shortage in tin plate this year, and consumers are rushing specifications in early to secure, as prompt shipment as possible. The American Sheet & Tin Plate Company is operating to about 85 per cent. of its hot tin mill capacity, but may possibly close down one of its works this week on account of shortage of steel. Other leading makers say they are operating to as full a capacity as the supply of steel will permit. There is some agitation for an advance in prices of tin plate, but so far there are no indications of an early change. The quotation in this report last week of \$3.50 for 100-lb. cokes was a typographical error and should have read \$3.60; 100-lb. ternes are firm at \$3.45 and No. 28 gauge black plate \$2.30 f.o.b. Pittsburgh.

Spelter.—The market is dull and neglected and prices have further declined. We quote prime grades at 6.20c., East St. Louis, equal to 6.32 $\frac{1}{2}$ c., Pittsburgh.

Railroad Spikes.—Heavy specifications are being received for railroad spikes. The Great Northern recently specified for 15,000 kegs with a local mill and the Baltimore & Ohio is also taking spikes in large quantities. The Pennsylvania Railroad, which uses a special spike made by a local concern and by a mill in the East, is specifying largely against its contracts placed some time ago. We quote railroad spikes in base sizes, $\frac{5}{16}$ x $\frac{9}{16}$ in., on large contracts with the railroads, at \$1.80, while for carload lots \$1.90 is charged. Small railroad and boat spikes are strong at \$1.90 to \$2 per 100 lb. f.o.b. Pittsburgh for forward delivery. For prompt delivery small railroad and boat spikes have sold as high as \$2.25 per 100 lb. at mill, being hard to obtain, most makers being back three to four months on their contracts.

Hoops and Bands.—The new demand is only fairly active, most consumers being covered up to July or longer. They are specifying freely against contracts. The mills have not yet opened their books for contracts for hoops and bands for third-quarter delivery. We quote steel bands at 1.40c. to 1.45c., with extras as per the steel bar card, and steel hoops at 1.60c. to 1.65c., f.o.b. Pittsburgh, these prices being on orders for shipment at convenience of the mills.

Shafting.—Specifications against contracts for shafting from the implement makers have quieted down to some extent, as they are pretty well covered for some months ahead, but they are already sending in inquiries on their requirements for next year, which is unusually early. Specifications from other consumers are active. We quote cold-rolled shafting at 58 per cent, off in carload and larger lots and 52 per cent, in small lots delivered in base territory.

Merchant Steel.—The new demand is keeping up fairly well, and specifications against contracts are still coming in freely. One leading maker states that its shipments for the first half of February were slightly heavier than in the same period last month. We quote: Iron finished tire, $\frac{1}{2}$ x $\frac{3}{8}$ in. and larger, 1.40c. to 1.55c., base; under $\frac{1}{2}$ x $\frac{3}{8}$ in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, $\frac{3}{4}$ to $\frac{7}{8}$ and 1 in., 1.90c. to 2c.; $\frac{1}{8}$ in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and $\frac{1}{2}$ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Wire Products.—The new demand for wire and wire nails is more active than usual at this season, which is taken as an indication of a very heavy spring trade. As yet none of the mills has followed the course of the Pittsburgh Steel Company in advancing wire nails to \$1.80 basis, but this may be done a little later. The mills report that specifications have not been quite so active the past week, but a heavier volume is looked for in March. We quote wire nails at \$1.75 per keg; cut nails, \$1.70 per keg; galvanized barb wire, \$2.15 per 100 lb.; painted, \$1.75; annealed fence wire, \$1.55, and galvanized fence wire, \$1.95, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

Bolts and Rivets.—There is no abatement in the new demand for bolts and rivets, which is abnormally heavy for this season, and makers report that specifications are still coming in freely. All the makers of bolts and rivets report a good part of their output under contract up to July. It is stated that regular prices are being maintained. We quote button head structural rivets at \$2.20 and cone head boiler rivets at \$2.30 per 100 lb. The discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads .....	.75 and 5% off
Small carriage bolts, rolled threads .....	.75 and 10% off
Large carriage bolts .....	.70% off
Small machine bolts, cut threads .....	.75 and 10% off
Small machine bolts, rolled threads .....	.75, 10 and 5% off
Large machine bolts .....	.70 and 7% off
Machine bolts with C.P.C. and T nuts, small .....	.75 and 5% off
Machine bolts with C.P.C. and T nuts, large .....	.70% off
Square hot pressed nuts, blanked and tapped	\$5.70 off list
Hexagon nuts	\$6.30 off list
C.P.C. and R. square nuts, tapped and blank	\$5.70 off list
Hexagon nuts $\frac{3}{4}$ and larger	\$6.60 off list
Hexagon nuts smaller than $\frac{3}{4}$	\$7.20 off list
C.P. plain square nuts	\$5.20 off list
C.P. plain hexagon nuts	\$5.50 off list
Semi-finished hexagon nuts $\frac{3}{4}$ and larger .....	.85% off
Semi-finished hex. nuts smaller than $\frac{3}{4}$ .....	.85 and 10% off
Rivets, 7/16 x 6 $\frac{1}{2}$, smaller and shorter .....	.75, 10 and 10% off
Rivets, metallic tinned, bulk	3 $\frac{1}{2}$ c. per lb. net extra
Rivets, tin plated, bulk	1 $\frac{1}{2}$ c. per lb. net extra
Rivets, metallic tinned, packages .....	.70, 10 and 10% off

Merchant Pipe.—Tentative inquiries are in the market for 400 to 500 miles of various sizes of line pipe, most of which is for delivery in Canada where heavy developments are going on in natural gas fields. Rights-of-way have to be obtained for some of the projected lines, so that definite information cannot be given at this time. Mills report that the new demand for merchant pipe is not quite so active as in the latter part of last year but is still heavier than usual at this season. Competition among a few of the smaller mills is keen and some shading in regular discounts on steel pipe is being done. The outlook for the pipe trade this year is regarded as very bright.

Boiler Tubes.—Makers of seamless tubing report a

continued heavy demand and state that they are back in deliveries three to four months. Locomotive tubes are also active, some heavy contracts having been placed lately by railroads that have been liberal buyers of locomotives. On some of the inquiries for locomotive tubes makers are refusing to quote, being unable to make the deliveries wanted. Merchant tubes are also in active demand, and all the mills are behind four to six weeks or longer.

Iron and Steel Scrap.—The demand is still quiet. Heavy steel scrap is being freely offered as low as \$14 delivered to mills, but without finding buyers, as consumers are covered for some time ahead. As a good deal of material is pressing the market, the outlook for the immediate future in the scrap trade is discouraging. Dealers are quoting per gross ton as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	\$14.00 to \$14.50
No. 1 foundry cast	15.00 to 15.25
No. 2 foundry cast	14.00 to 14.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	12.00 to 12.25
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	16.25 to 16.50
No. 1 railroad malleable stock	14.25 to 14.50
Grate bars	10.75 to 11.00
Low phosphorus melting stock	18.00 to 18.25
Iron car axles	24.25 to 24.75
Steel car axles	17.75 to 18.00
Locomotive axles, steel	21.75 to 22.00
Locomotive axles, iron	27.75 to 28.00
No. 1 bushing scrap	14.25 to 14.50
No. 2 bushing scrap	10.25 to 10.50
Old carwheels	15.75 to 16.00
*Cast-iron borings	10.00 to 10.25
*Machine shop turnings	9.50 to 9.75
†Steel bar crop ends	16.50 to 16.75
Old iron rails	16.25 to 16.50
No. 1 railroad wrought scrap	16.00 to 16.25
Heavy steel axle turnings	12.75 to 13.00
Stove plate	10.75 to 11.00

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Coke.—In the past week standard grades of furnace coke sold at \$2.35 to \$2.50, and a fair range of the market to-day is \$2.25 to \$2.40 per net ton at oven. The Pittsburgh Steel Company is still in the market for 30,000 tons of coke per month, shipments commencing in May, but it is doubtful if any one operator is in position to take this large amount of business; if placed, it will probably be divided between two or three producers. The market on foundry coke has declined materially. We quote standard makes of furnace coke for spot shipment at \$2.25 to \$2.40 and on contracts about \$2.50 per net ton at oven. Standard makes of 72-hr. foundry coke for prompt delivery are offered at \$3 and some grades as low as \$2.75 at oven. The output of coke in the Upper and Lower Connellsville regions last week is given by the Connellsville Courier as 410,443 net tons, a decrease over the previous week of 12,310 tons.

Chicago

CHICAGO, ILL., February 19, 1913.—(By Telegraph.)

The volume of sales and specifications of finished steel products is being maintained at higher figures here than elsewhere, apparently just as this market preceded other districts in the booking of tonnage over a year ago. Mill reports for the past week show little falling off in tonnage, bookings still being in excess of shipments, while the business offered upon which the makers are unable to quote is a sustaining factor for the future. This is especially true in that there appear to be few instances where failure to obtain materials is causing the abandonment of projects. What is said of the mill situation applies equally to local iron and steel warehouses, and on steel bars particularly the heavy demands from an unusually wide territory are being satisfied in this market. A number of miscellaneous lots of rails are under negotiation, and an inquiry for a large tonnage of tie plates is noted. Eastern mills are taking orders upon which no local quotations can be obtained, and on plates in particular premiums are being asked for early deliveries, making the delivered prices almost equivalent to local store prices. Semi-finished steel, when obtainable at all, commands fancy prices. Sheets present practically the only irregularities in the market among steel products. In pig iron, both buyers and sellers appear to be sparring for the advantage with tendencies toward weakness on the part of the furnaces. Inquiries have been scarce, but this is an arbitrary condition rather than an indication of consumers' actual needs. The scrap situation is unimproved.

Pig Iron.—The offering and sale of a number of lots of local offgrade iron during the past week for

prompt shipment at the best prices obtainable have given the market an appearance of irregularity and weakness which is not altogether true of standard grades, some sales of which are recorded at \$18, f.o.b. furnace for No. 2. In some transactions, where the iron involved is to be used as No. 2, prices as low as \$17.25 were made. Several sales of charcoal iron were made at \$18.25, Chicago. The Southern iron situation is unchanged. With one exception, the leading Birmingham brands are well sold up, and \$14.50 is still the asking price for forward delivery, while some iron can be had at \$14 and at \$13.50. Spot shipment iron from the South, and of exceptionally good grading, is being moved at \$14, being practically equivalent to \$13.50 for No. 2. Inquiry is light, consumers apparently holding back for a break in the market which would afford an advantageous opportunity for covering their requirements. The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4....	\$18.00 to \$18.75
Northern coke foundry, No. 1.....	17.75 to 18.25
Northern coke foundry, No. 2.....	17.25 to 18.00
Northern coke foundry, No. 3.....	16.75 to 17.25
Southern coke, No. 1 foundry and No. 1 soft	18.35 to 18.85
Southern coke, No. 2 foundry and No. 2 soft	17.85 to 18.35
Southern coke, No. 3	17.35 to 17.85
Southern coke, No. 4	16.85 to 17.35
Southern gray forge	16.85 to 17.35
Southern mottled	16.35
Malleable Bessemer	17.25 to 17.75
*Standard Bessemer	19.40 to 19.90
Basic	17.25 to 17.75
Jackson Co. and Kentucky silvery, 6 per cent.....	20.40
Jackson Co. and Kentucky silvery, 8 per cent.....	21.40
Jackson Co. and Kentucky silvery, 10 per cent.....	22.40

(By Mail)

Rails and Track Supplies.—A number of small lots of rails are under negotiation, including 7000 tons for the Waterloo, Cedar Falls & Northern, 2500 tons of 80-lb. sections for the Stock Yards & Union Transit, 1200 tons for the Peoria & Pekin Union, and 1000 tons of girder rails. Bessemer rails are being taken on some of these small purchases to secure early delivery. An inquiry for 10,000 tons of tie plates brought out a quotation of \$33 f.o.b. mill, but carload lots command prices from \$1 to \$2 a ton higher. The increased demand for tie plates in the past two years has been remarkable and local makers are filling orders at capacity rate. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, \$32 to \$34.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Contracts for the fabrication of structural steel totaling over 9000 tons are noted as having been placed in the past week. They include 3000 tons of pipe bands for delivery at Portland, Ore., to be furnished by the Colorado Fuel & Iron Company; 2170 tons for the Davenport Hotel at Spokane, awarded to the Minneapolis Steel & Machinery Company; 1138 tons for the Stewart Apartments, Chicago, to be fabricated by the American Bridge Company, which will also furnish 904 tons for the Deardorff Building at Kansas City and 136 tons for two turntables for the Chicago & Northwestern Railway Company. The steel for the Roosevelt-Mesa transmission line in Arizona will be fabricated by the Chicago Steel Products Company and 970 tons for a new power house for the J. I. Case Threshing Machine Company, Racine, by the Kenwood Bridge Company. The Ralston Iron Works will furnish 368 tons for a residence at San Mateo, Cal., and the Western Iron Works 200 tons for a warehouse for Libby, McNeill & Libby at Sacramento. Mill conditions with relation to structural shapes are practically unchanged with current specifications still exceeding shipments in tonnage. Additional car business includes 1000 box cars placed with the Western Car & Foundry Company by the Rock Island Lines, and inquiries for 1000 cars from the Missouri, Kansas & Texas and 100 rock cars of all steel construction for the Mineral Range road of the copper peninsula. The Lake Shore & Michigan Southern is in the market for 23 locomotives. We quote for Chicago delivery of plain shapes, 1.63c.

The general activity and aggregate of tonnage being purchased out of store show a steady increase. One jobber reports February sales thus far as exceeding those of the corresponding period in January by 20 per cent. Prices are unchanged and we quote on base sizes 2.05c.

Plates.—The leading mills are probably booked farther ahead on plates than on any other product and correspondingly quotations from mill for deliveries in

from two to four weeks bring out some of the most striking instances of premium prices. Quotations on tank plate are noted as high as 1.98c. delivered, Chicago, for delivery in two weeks, while more extended delivery commands as high as 1.78c. We quote for such delivery as the mills can make 1.63c.

Sub mill quotations for prompt shipment running as high as 1.80c. and 1.98c., plates out of store in small quantity and cut to size are comparatively cheap at current prices. We quote for base steel 2.05c.

Bars.—Although the volume of bar iron business offering is not quite so heavy as heretofore, mills are well filled for some weeks in advance and prices are firmly held on the basis of 1.60c. The mill situation on steel bars is practically a closed proposition for the first half at least, although accommodations are found for the small miscellaneous offerings from customers whose requirements are particularly pressing. Steel bars for building purposes are particularly scarce, as the mills are indisposed to divert the raw steel for this use. The demand for semi-finished steel in the form of sheet bars and billets continues keen. A lot of a few hundred tons of small forging billets was sold in this market at the price of bars, or 1.58c. at the mill, while another quotation of \$38 is noted. We quote for mill shipment as follows: Bar iron, 1.60c. to 1.65c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

The demand on warehouses for bars and small angles is taxing the resources of the smaller stocks, and the larger jobbers are being called upon to ship into more extended territories to meet the apparently increasing necessities of consumers. For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes 34 in. and over, and 7½c. extra for smaller sizes; shafting 51 per cent. off.

Sheets.—A number of small sheet mills and mills buying their sheet bars in the market, which are under necessity of moving their product continuously, create an active competition for all the sheet business offering, even though this volume is far from small and the larger mills are booked for a number of weeks ahead. In consequence, sheet prices lack some of the firmness characterizing other finished steel products. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.68c.; No. 10 blue annealed, 1.93c.

Out of store prices continue without change as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

Old Material.—Little activity is noted and prices are in a measure nominal, with some actually lower quotations reported. Of the large tonnage of scrap offered by the railroads a week ago, the larger portion is understood to have been sold, with the exception of the Atchison, Topeka & Santa Fé list. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	\$16.25 to \$16.75
Old steel rails, rerolling	15.50 to 16.00
Old steel rails, less than 3 ft.	14.00 to 14.50
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	16.75 to 17.25
Heavy melting steel scrap	12.25 to 12.75
Frogs, switches and guards, cut apart	12.25 to 12.75
Shoveling steel	12.25 to 12.75
Steel axle turnings	10.50 to 11.00
Per Net Ton.	
Iron angles and splice bars	\$15.50 to \$16.00
Iron arch bars and transoms	16.00 to 16.50
Steel angle bars	12.00 to 12.50
Iron car axles	21.00 to 21.50
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.50 to 12.00
Cut forge	11.00 to 12.00
Steel knuckles and couplers	12.25 to 12.75
Steel springs	12.75 to 13.25
Locomotive tires, smooth	13.75 to 14.00
Machine shop turnings	7.50 to 8.00
Cast and mixed borings	6.50 to 7.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.75 to 8.25
No. 1 boilers, cut to sheets and rings	8.75 to 9.25
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	12.50 to 13.00
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	13.00 to 13.50
Agricultural malleable	11.75 to 12.25
Pipes and flues	9.25 to 9.50

Rivets and Bolts.—The oversold condition of most bolt makers is holding the price situation decidedly firm despite some temporary quietness in demand. The rivet situation is easy, with the heavy demand for spring building operations not yet well under way. We quote from mill as follows: Carriage bolts up to ¾ x 6 in., rolled thread, 75-10; cut thread, 75-5; larger sizes, 70-2½; machine bolts up to ¾ x 4 in., rolled thread, 70-10-5; cut thread, 75-10; large sizes, 70-7½; coach screws, 80-10; hot pressed nuts, square head, \$5.70 off

per cwt.; hexagon, \$6.30 off per cwt. Structural rivets, ¾ to 1¼ in., 2.38c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-7½; larger sizes, 65-5; carriage bolts up to ¾ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, \$5.30, and hexagon, \$5.90 off per cwt.

Wire Products.—Business in wire nails, which reaches a maximum in April, has begun to be more active. While some of the mills have undoubtedly been content to dispose of their raw steel at premium prices, warehouse and jobbers' stocks are in comfortable shape to meet the demands of spring trade, and finished material is going forward at a good rate. The development of the demand for steel fence posts is very rapid, and is likely to be increasingly so owing to the scarcity of timber for fencing purposes. We quote as follows: Plain wire, No. 9 and coarser, base, \$1.73; wire nails, \$1.93; painted barb wire, \$1.93; galvanized, \$2.33; polished staples, \$1.93; galvanized, \$2.33, all Chicago.

Cast Iron Pipe.—An award of 700 tons of pipe was made at Dayton, Ohio. Advices from a large number of the smaller towns indicate that the usual volume of spring water improvements will materialize but the larger municipal work is slow in developing. We quote as follows per net ton, Chicago: Water pipe, 4 in., \$31; 6 to 12 in., \$29; 16 in. and up, \$28, with \$1 extra for gas pipe.

The Morris Iron & Machinery Company, Springfield, Ill., has been incorporated with a capital stock of \$2500 to deal in scrap, the incorporators being H. P. Morris, F. M. McGowan and J. H. Thomas.

Philadelphia

PHILADELPHIA, PA., February 18, 1913.

Makers of finished iron and steel continue to receive heavy specifications and new business, particularly in connection with railroad equipment and boat work, is most promising. Ship yards in this district have bids out on four vessels, which will require a considerable tonnage of plates and shapes. An even volume of business is reported in billets and sheets. Iron bars are in less urgent demand. The pig iron markets continue to drag. Buyers hold off on one pretext or another, awaiting developments regarding prices. No further recessions have been announced, but there has been insufficient business in any grade to establish a market. The old material market is dull and irregular. Lower prices for heavy melting steel are reported. Little change has been shown in the coke market. Prompt furnace coke was sold at \$2.20 and \$2.30 at oven.

Iron Ore.—There is little movement in either foreign or domestic ore. Several consumers have been figuring on small lots of prompt ore, but no sales have been made. In connection with Cuban ore, it is interesting to note the chartering of seven vessels by the Bethlehem Steel Company to engage in the Cuban ore trade. Importations during the week were confined to a cargo of 5794 tons of Spanish ore.

Pig Iron.—Outside of one transaction in rolling mill forge, the market exhibits no change from the characteristic dullness which has been in evidence for about a month. A Schuylkill Valley rolling mill has closed for 2500 tons of high sulphur forge, which went at a concession from recent quotations for standard analysis iron. Small sales of standard forge have been made at quotations ranging from \$17.25 to \$17.50 delivered. One large buyer of forge iron, who was expected to enter the market before this, is believed to be holding back in anticipation of a lower price level. The movement in foundry grades has been confined almost exclusively to small lots for early shipment. Reports are current of a better volume of inquiry of this class, but coming largely from buyers who wish to fill in shortages in their requirements. Here and there producers are showing more unrest at the continued lack of new orders, notwithstanding the fact that deliveries are going forward steadily and in a number of cases exceed current production. Consumers continue to urge makers for shipments and frequently make efforts to have their March quota anticipated. Prices for standard brands of eastern Pennsylvania No. 2X foundry appear to be pegged at \$18.25 delivered, as a minimum, although the market has not been seriously tested by any inquiry sufficient to bring out close competition. Some business in Virginia pig iron has been moving in New England, but the demand from consumers in this district has been extremely light. The majority of Virginia producers now accept \$15.50 at furnace, for either

prompt or first half No. 2X foundry. Cast iron pipe makers, while not active buyers, are showing more interest in the market. One Delaware River buyer has offered \$16.75 delivered for moderate lots of low grade iron, but makers are not disposed to let go at that figure, particularly when the supply is small. Reports of tenders of resale Southern iron at concessions are heard, but few sales have been consummated. Small sales of Mayari foundry pig have been made at \$22 at furnace. Moderate transactions have been put through in charcoal pig iron, and it is reported that a recent inquiry for a round lot of coke malleable pig iron has been covered. Steel making irons continue dull. Basic is uncalled for; makers talk \$18 for this grade for second quarter, but the quotation is entirely nominal. Carload lots of standard analysis low phosphorus iron have been sold at \$24.50 delivered here and Lebanon low phosphorus at \$21 at furnace. The general range of pig-iron prices is nominally unchanged, the following quotations about representing the market for delivery in buyers' yards in this district:

Eastern Pennsylvania No. 2 X foundry.....	\$18.25 to \$18.50
Eastern Pennsylvania No. 2 plain.....	18.00 to 18.25
Virginia No. 2 X.....	18.30 to 18.50
Virginia No. 2 plain.....	18.05 to 18.75
Gray forge.....	17.25 to 17.50
Basic, nominal.....	18.00
Standard low phosphorus.....	24.50

Ferroalloys.—The market is extremely quiet. Very little demand has developed for 80 per cent. ferromanganese, prices for which are unchanged at \$65, seaboard, for either prompt or forward shipment. Ferrosilicon has been in light inquiry. One car load sale, at unchanged prices, is reported.

Billets.—A continued moderate demand for both rolling and forging billets is coming to Eastern mills, which are so well booked ahead that orders of any considerable size, involving delivery over the first half, are hard to place. Consumers are anxious to place contracts covering extended forward shipments, but mills are not inclined to enter business for deliveries extending beyond the first half. Urgency from consumers for quick deliveries continues pronounced. Mills continue to operate at full capacity and experience difficulty in keeping up to promised deliveries. Prices are very firm, current business in basic open hearth rolling billets commanding \$32, delivered, while forging billets are quoted at \$30, minimum, Eastern mill.

Plates.—The volume of business coming to the mills continues heavy. Specifications for plates entering into the construction of railroad equipment have been numerous, and practically all the mills are receiving specifications at full capacity rates. One Eastern mill has taken on business involving a large tonnage, at full prices, for export to Canada. Further business in ship plates, covering bids for four vessels, is in sight. Inquiries for structural plates continue heavy. Eastern mills still confine acceptances to orders involving delivery up to the end of the first half, although consumers would contract for more extended shipment. Western plates for uncertain extended delivery are available at 1.65c. here, while Eastern mills readily obtain 1.75c. for sheared and 1.80c. for universal plates, as a minimum for delivery in this district, extending over the first half.

Structural Material.—Fabricators are estimating on considerable bridge work, including several bridges for the Norfolk & Western Railroad, involving some 7000 to 8000 tons. Several small building projects in this and adjacent territory have come out. In this city pending business in buildings aggregates some 5000 tons. In addition to the large volume of business in boat shapes recently placed, further good orders are ahead. Plain shapes continue in active demand and mills experience difficulty in meeting customers' demands for delivery. Quotations are firm and unchanged. Eastern mills quote 1.75c. delivered for plain shapes for first half, while prompt shipments, when available, easily bring from 1.85c. to 2c. delivered.

Sheets.—Producers continue to enter a large volume of business both for near future and forward shipment. A limited amount of third quarter business continues to be taken. Mill operations are at full capacity, and the volume of urgent business appears to be increasing. Sheets for prompt shipment are scarcer. Quotations are unchanged. Western No. 10 blue annealed sheets are quoted at 1.9cc., delivered here, while Eastern mills making smooth, loose-rolled sheets, readily obtain 2.05c., delivered, for the same class of material.

Bars.—Current business has been less active. Iron bars are in better supply and makers are able to meet

customers' demands for delivery more satisfactorily. Under the circumstances premiums for prompt shipment are not so general. Some mills are seeking business more aggressively, but prices are maintained at the recent minimum of 1.67½c., delivered here. Steel bars continue in active demand at unchanged prices—1.55c. to 1.60c. here for extended delivery and 1.85c. for prompt shipment.

Coke.—Little activity is shown in either furnace or foundry grades. Prompt furnace coke is in good supply, but prices show more firmness, round lot sales being made in this district at \$2.30 and \$2.20 at oven. Very little contract business is being entered. Foundry coke is firm in spots, some brands commanding \$4.50 at oven while others are available at \$3.75 to \$4. The following range of prices, per net ton, is named for delivery in buyers' yards in this vicinity:

Connellsville furnace coke.....	\$4.70 to \$5.20
Connellsville foundry coke.....	5.75 to 6.25
Mountain furnace coke.....	4.35 to 4.85
Mountain foundry coke.....	5.40 to 5.90

Old Material.—Very little is being done in any grade. The market continues weak, although forced sales appear less in evidence. Sales of No. 1 heavy melting steel have been made in moderate lots at \$13, delivered, and the leading consumers now name \$12.50 as their price. Car wheels are easier, as low as \$14.50 having been paid for wheels on recent railroad lists. Rolling mill grades have been inactive. Quotations on all classes of old material are nominal; in few instances has enough business been done to establish a price. The following range about represents the market for small lots, delivered in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel.....	\$12.50 to \$13.00
Old steel rails, rerolling (nominal).....	15.50 to 16.00
Low phosphorus heavy melting steel scrap.....	18.00 to 18.50
Old steel axles (nominal).....	19.00 to 20.00
Old iron axles (nominal).....	27.00 to 28.00
Old iron rails.....	18.00 to 18.50
Old carwheels.....	15.00 to 15.50
No. 1 railroad wrought (nominal).....	15.00 to 15.50
Wrought-iron pipe.....	12.50 to 13.00
No. 1 forge fire.....	12.00 to 12.50
No. 2 light iron (nominal).....	7.00 to 7.50
No. 2 cut busheling.....	10.00 to 10.50
Wrought turnings.....	10.50 to 11.00
Cast borings.....	10.50 to 11.00
Machinery cast.....	14.50 to 15.00
Grate bars, railroad.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Railroad malleable (nominal).....	13.50 to 14.00

Birmingham

BIRMINGHAM, ALA., February 17, 1913.

Pig Iron.—Although the volume of sales continues small, several operators report more briskness in inquiries. Prices realized on sales made have been around \$13.50 to \$14 with, it is understood, an occasional shading of the lower price by merchants. One furnace interest is still offering a considerable tonnage at \$13.50, but it is not reported as making large sales at the concession. All others report adherence to the \$14 minimum and that price is obtained in the carload and other small lots that mark the current business. It is understood that 1500 tons was sold to the leading pipe maker on the regular furnace iron basis. Three 100-ton lots brought \$14 and \$14.50, while Clifton iron is sold at \$14.50 to \$15 by the Alabama Consolidated Coal & Iron Company, which is exclusively making that brand at this time. It is understood that furnaces in Tennessee are sacrificing their freight rate differential in the majority of transactions and selling at \$13.50. A well-informed broker declares that resale iron is disappearing, and regards this as a harbinger of a stronger market. As a general proposition, quotations are f.o.b. cars at Birmingham as follows:

No. 1 soft and foundry.....	\$14.00 to \$14.50
No. 2 soft and foundry.....	13.50 to 14.00
No. 3 foundry.....	13.00 to 13.50
No. 4 foundry.....	12.50 to 13.00
Gray forge.....	12.75 to 13.25
Basic.....	14.00 to 14.50
Charcoal.....	25.00 to 25.50

Old Material.—Cast and steel scrap are in good demand, but wrought grades are dull. The influx and outgo of the local yards are about the same and stocks vary but little. The general run of business is not so large as it has been owing to the pig-iron market, but quotations have been changed only slightly and are f.o.b. dealers' yards in Birmingham as follows, per gross ton:

Old iron axles	\$15.50 to \$16.00
Old steel axles	15.50 to 16.00
Old iron rails	15.50 to 16.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	10.50 to 11.00
No. 1 heavy melting steel	11.00 to 11.50
Tram carwheels	12.00 to 12.50
Standard carwheels	12.50 to 13.00
Light cast and stove plate	9.50 to 10.00

Coal and Coke.—Notwithstanding the decline in coke in other sections, there has been none in Alabama. The best grades of foundry coke are selling at \$4 to \$4.25 per net ton at oven and the minimum price seems to adhere to around \$3.75. The demand is brisk, and inquiries from Mexico and Texas indicate more business in that direction. Coal miners are receiving the advance in wages announced as effective February 1. The output is at its maximum, prices are steady and the movement is free.

Cast-Iron Pipe.—The expected order of 4500 tons of water pipe for San Diego, Cal., did not materialize owing to matters connected with the bond issue and may be held up for some time. No other large requirements have been figured on. Orders for small lots are fair. Shipments are light. General conditions show a slight tendency to betterment. Quotations are continued at \$24.50 per net ton for 4 in. and \$22.50 for 6 in. and over, with \$1 added for gas pipe.

Cleveland

CLEVELAND, OHIO, February 18, 1913.

Iron Ore.—The railroad rate situation as regards ore shipments from the Old Range mines to the Michigan ports of Escanaba and Marquette has not been cleared up, ore firms having received no advices as to what, if any, revision or increase of rates the railroads propose to make, but expect to hear this week. The withdrawals of the dock charges recently placed in the tariffs of the railroads appears to have been the last official development in the matter. There is no inquiry for ore and no activity is expected until well along in the spring. Dock shipments are good, and with the approach of milder weather some new shipping orders are coming in. We quote prices as follows: Old Range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; Old Range non-Bessemer, \$3.60; Mesaba non-Bessemer, \$3.40.

Pig Iron.—The market is dull and prices weak. Consumers are disposed to hold off. In the absence of inquiries some sellers are holding to their recent quotation of \$17.50 for No. 2 foundry, but would probably meet competition should a buying movement set in. One interest which reduced its price to \$17, Cleveland furnace, for No. 2, as noted last week, is making that quotation for delivery until July. Another is quoting that price for shipment from its Valley furnace, recently blown in, for delivery through the last half. This furnace has sold a round tonnage of off-grade iron at low prices. In standard foundry grades some small sales are being made for prompt shipment, but there is practically no inquiry for the last half. The demand for iron on contracts is as heavy as ever. The Southern situation continues weak. No. 2 Southern is offered at \$13.50, Birmingham, for delivery the remainder of the year. For prompt shipment and for the first half we quote, delivered Cleveland, as follows:

Bessemer	\$18.15
Basic	\$17.25 to 17.40
Northern No. 2 foundry	17.25 to 17.75
Southern No. 2 foundry	17.85 to 18.35
Gray forge	17.00 to 17.25
Jackson County silvery, 8 per cent. silicon	20.55 to 21.55

Coke.—The market is unsettled as regards prices. There is no demand for furnace grades. The only call for foundry coke is for small lots for prompt shipment. Consumers will not contract at present prices. We quote Standard Connellsville furnace coke at \$2.50 per net ton at oven for spot shipment and \$2.50 to \$3 for contract. Standard 72-hour Connellsville foundry coke is held at \$3.50 to \$3.75 for spot shipment and contract.

Finished Iron and Steel.—The demand for early delivery has increased, and considerable tonnage has been booked at premium prices. For early delivery eastern mills are taking plate orders at 1.60c. to 1.70c. and orders for structural material at 1.65c. to 1.75c. For delivery in about 60 days one Pittsburgh mill is quoting plates at 1.60c. and structural material at 1.50c. Specifications are heavy and none of the mills appears to be catching up on deliveries. There is little new struc-

tural work coming out. It is believed that the inability to secure deliveries on steel is causing postponement of building projects requiring round tonnages. The Thew Automatic Shovel Company, Lorain, Ohio, has received bids for 150 tons for a factory addition. Sheets continue in good demand and are hard to get for early delivery; some mills are getting a premium of \$1 a ton on black sheets and \$2 a ton on galvanized sheets above regular quotations for shipment in 8 to 10 weeks. Bar iron is in fair demand and local mills are considerably behind on shipments. The price is firm at a minimum quotation of 1.65c., Cleveland. Warehouse business is heavy, orders coming from a more widely scattered territory than ever before. Jobbers' prices are unchanged at 2.10c. for steel bars and 2.25c. for plates and structural material.

Old Material.—The market is almost lifeless. The light demand and abundance of material offered have resulted in further weakening of prices and quotations on several grades are 50c. a ton lower than a week ago. The mills expect a further decline in prices and are buying only small lots to meet immediate requirements. Some new heavy melting steel scrap has been sold to a local mill at about \$14.75, but on ordinary heavy melting stock \$13 appears to fairly represent the local market. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling	\$15.00 to \$15.50
Old iron rails	16.50 to 17.00
Steel car axles	18.75 to 19.25
Heavy melting steel	12.75 to 13.25
Old car wheels	15.00 to 15.50
Relaying rails, 50 lb. and over	23.00 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.50 to 14.00
Light bundled sheet scrap	12.00 to 12.50
Per Net Ton	
Iron car axles	\$21.00 to \$21.50
Cast borings	6.50 to 7.00
Iron and steel turnings and drillings	6.50 to 7.00
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 1 cast	12.50 to 13.00
Stove plate	10.00 to 10.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, February 17, 1913.

Pig Iron.—A better inquiry has developed, although it is mostly for limited lots. Sales books also make a better showing. Resale iron in both Southern and Northern territory has been offered as low as \$13.25, Birmingham basis, and at \$16.25 Iron-ton, for spot shipment; yet it is doubtful if any considerable quantity could be purchased at these figures. The iron offered is confined to No. 2 foundry only, as the lower grades are scarce. A prominent feature of the present situation is that more sales are being made at quotations of \$13.50, Birmingham, and \$16.50, Iron-ton, than below these prices, and should a buying movement develop the holders of the small lots of warrant iron mentioned will undoubtedly be able to dispose of them without greatly disturbing the market. The consumption of foundry iron is especially good in this territory, as is evidenced by urgent calls for shipments on contracts, and users of basic are melting considerably more than they anticipated when their present contracts were made. A Michigan melter booked 500 tons of Northern foundry iron for first half shipment, and another consumer in the same territory took a like quantity of Southern No. 2 foundry for May-August shipment. Another reported sale covers 500 tons of Southern No. 2 foundry, to a northern Ohio firm at \$13.50, Birmingham, which shows that present quotations are being made on last half business. The Ohio silvery irons are in fair demand, but malleable is slow and is quoted at the same price as Northern No. 2 foundry. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	\$17.00 to \$17.50
Southern coke, No. 2 foundry and 2 soft	16.75 to 17.25
Southern coke, No. 3 foundry	16.50 to 17.00
Southern, No. 4 foundry	16.25 to 16.75
Southern gray forge	16.00 to 16.50
Old silvery, 8 per cent. silicon	20.70 to 21.20
Southern Ohio coke, No. 1	18.20 to 18.70
Southern Ohio coke, No. 2	17.70 to 18.20
Southern Ohio coke, No. 3	17.45 to 17.70
Southern Ohio malleable Bessemer	17.70 to 18.20
Basic, Northern	18.20 to 18.70
Lake Superior charcoal	19.25 to 19.75
Standard Southern car wheel	27.25 to 27.75

Coke.—The increased production in the Connellsville district has caused a further reduction in spot shipment prices. It is not unlikely that as low as \$2.50 per

net ton at oven can be done on several leading brands that were being sold about 50 per cent. higher 30 days ago. Should the pig iron market improve, several furnaces now idle may blow in and help out the coke situation. From \$2.50 to \$2.75 per net ton at oven represents both the spot and contract market in all three producing fields. Foundry coke shows little change and is quoted all the way from \$2.75 to \$3.25, with \$3 as an average figure on prompt business. While inquiries are not numerous, there is enough demand for 72-hr. coke to hold prices on a firmer basis than those quoted on 48-hr. coke.

Finished Material.—Mill agencies report that specifications continue coming in freely enough to crowd order books. This applies to practically all classes of finished materials, including hoops and bands. On some products the mills have not yet opened their books for last half business, although this is not the case on structural shapes. Local warehouses are doing an excellent business for this time of the year, and prices are firm around 2c. to 2.10c. on steel bars and 2.05c. to 2.15c. on structural material. The rolling mills are still having trouble making deliveries on contracts for sheets.

Old Material.—Dealers claim that offerings greatly exceed the demand just at present, and as a consequence prices are beginning to show further signs of softening. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum figures are dealers' prices f.o.b. yards:

Per Gross Ton.	
Bundled sheet scrap	\$10.50 to \$11.00
Old iron rails	14.00 to 14.50
Relaying rails, 50 lb. and up.	21.00 to 21.50
Rerolling steel rails	13.00 to 13.50
Melting steel rails	11.00 to 11.50
Old carwheels	12.75 to 13.50

Per Net Ton.	
No. 1 railroad wrought	\$11.00 to \$11.50
Cast borings	7.00 to 7.50
Steel turnings	7.50 to 8.00
No. 1 cast scrap	10.75 to 11.25
Burnt scrap	7.75 to 8.25
Old iron axles	18.25 to 18.75
Locomotive tires (smooth inside)	12.00 to 12.50
Pipes and flues	7.50 to 8.00
Malleable and steel scrap	9.25 to 9.75
Railroad tank and sheet scrap	6.25 to 6.75

St. Louis

ST. LOUIS, Mo., February 17, 1912.

New business is rather quiet, with the single exception of finished steel where the orders run to a good total. There is no disposition to lower prices in pig iron, but coke is getting softer. It is thought that it will be close to the end of the first quarter before there is any marked renewal of activity, but no recession in prices is anticipated.

Pig Iron.—Insistence on forward movement of lots under contract is still emphatic. Consumers are keeping right up to their allotments and in a considerable number of cases are ahead of their expected requirements. The largest sale was one lot of 500 tons of No. 2 foundry, Southern, at \$13.50; all the rest of the business reported during the week was in 50-ton and carload lots. There are no intimations of early purchases. The quotations remain as at last reports, but with no softening tendency. Representatives express belief in buying toward the end of the quarter, but offer no specific reasons therefor.

Coke.—The coke market continued to soften during the week. The figures on by-product coke continue on a parity with the Connellsville figures. Sales were all in small lots.

Finished Iron and Steel.—In the finished product market the aggregate of business has been large, but there have been no big individual contracts save one for 1000 tons of structural material for an office building in Kansas City. Demand is coming from all directions and shops are working hard to get stocks in shape for the spring construction movement. Demand for wagon and agricultural material is good and there seem to be no signs of a let up. Southwestern buyers are expected to get into the market before long for standard section rails. Track fastenings continue in good demand for the season. Bars are in excellent request generally. In plates very little is doing in this territory.

Old Material.—A softening tendency in quotations re-developed and practically everything is marked down from the quotations of a week ago. The railroads came into the market with quite heavy lists, including the

Missouri Pacific with 2100 tons, the Wabash with 750 tons and the Mobile & Ohio with 400 tons. All went at lower figures. Most of the Missouri Pacific material went to a Western interest, while the Wabash material went to Pittsburgh and Eastern concerns. The Mobile & Ohio was taken locally. Both steel and rolling mills continue to keep out of the market and the rise in temperature seems to be bringing more material into sight than was anticipated. Under these conditions there is at present nothing to encourage a hope for an improvement in prices, unless the mills change their present attitude of holding off. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$13.00 to \$13.50
Old steel rails, rerolling	15.00 to 15.50
Old steel rails less than 3 ft.	13.00 to 13.50
Relaying rails, standard section, subject to inspection	22.50 to 23.50
Old carwheels	15.00 to 15.50
Heavy melting steel scrap	12.50 to 13.00
Frogs, switches and guards cut apart	12.25 to 12.75

Per Net Ton.	
Iron fish plates	\$11.50 to \$12.00
Iron car axles	20.00 to 21.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	11.75 to 12.25
No. 2 railroad wrought	11.50 to 12.00
Railway springs	11.00 to 11.50
Locomotive tires, smooth	12.00 to 12.50
No. 1 dealers' forge	8.50 to 9.00
Mixed borings	6.50 to 7.00
No. 1 busheling	10.50 to 11.00
No. 1 boilers, cut to sheets and rings	7.00 to 7.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	8.50 to 9.00
Railroad malleable	11.00 to 11.50
Agricultural malleable	8.50 to 9.00
Pipes and flues	7.00 to 7.50
Railroad sheet and tank scrap	7.00 to 7.50
Railroad grate bars	8.50 to 9.00
Machine shop turnings	8.25 to 8.75
Bundled sheet scrap	7.00 to 7.50

San Francisco

SAN FRANCISCO, CAL., February 11, 1913.

The volume of new business and specifications going into the mills is comparatively light, due to the liberal supplies held by merchants and large consumers. In some of the heavier lines, notably rails, structural material and cast-iron pipe, the new tonnage booked is rather below expectations. The consuming demand in all other products, however, is heavy for the season.

Bars.—The demand for reinforcing bars is fully maintained. The jobbing demand for soft steel bars has so far been far ahead of last year and is still increasing. Supplies are still fairly large, however, and specifications are limited rather closely to filling in short sizes. Local jobbing prices are firmly held at 2.75c. for steel and 2.65c. for iron.

Structural Material.—While building records for January are highly encouraging, and considerable business seems to be in sight, current business is quiet. Much of the January tonnage went to Eastern fabricators, and some local shops are running on a very small scale. Very low figures are said to have been submitted on some recent jobs. Figures will be taken February 27 on the Oakland Auditorium. The Ralston Iron Works has taken a good sized job on the Crocker residence, and the Western Iron Works has the Fresno Estate building contract, Fresno, Cal., amounting to nearly 600 tons. The principal prospective job in Oakland is held up for alterations. The Baker Iron Works, Los Angeles, has a contract for a 9-story building at Fifth street and Broadway, that city, and bids are being taken on a building at Eighth and Spring streets. Tehama County, Cal., is having plans drawn for a bridge and a jail to cost \$50,000 each.

Rails.—The current tonnage is rather light, as nothing has been heard recently from the larger buyers who are expected in the market. A few scattering orders for heavy rails are coming in, but buyers of light rails are taking only enough for current needs, single orders being smaller than usual. Orders for logging roads have not yet been numerous but a heavier movement is expected in the second quarter.

Sheets.—Merchants are well able to supply the small trade from store, and are willing to let stocks diminish considerably before buying on a large scale. Many lines of sheet product are in strong demand, however, and the jobbing trade is extremely active. The town of Redlands, Cal., has just taken on a lot of riveted pipe.

Plates.—Little new inquiry of an important nature

is used, and the distributive trade remains on the same moderate scale as for some time. The Standard Oil Company is assembling material for an addition to the refinery at El Segundo.

Merchant Pipe.—Figures have just been taken on another oil line inquiry, that of the General Construction Company for about 60 miles of 8-in. pipe. Aside from this, mill agents report a rather quiet market, as the general oil-field demand has not yet started in a large way, and merchants' specifications are light. The consuming demand is strong, and the small trade through the country is drawing heavily on local stocks. Specifications for fittings are comparatively large.

Cast Iron Pipe.—The expected tonnage from San Diego has not been placed, and the taking of bids has been put off to May or June. Otherwise there is no single inquiry of much importance, though small orders from private concerns continue fairly numerous. Local quotations are \$37.50 per net ton for 4 in.; \$35.50 for 6 to 10 in., and \$35 for larger sizes.

Pig Iron.—The volume of foundry work is well maintained, and as a number of melters are running short of supplies there is no more business, both for spot and forward delivery, than for some time past. No foreign iron has arrived recently, and if ocean freights are maintained there will doubtless be an active movement of domestic iron in the spring. Several good contracts have been booked for second-quarter Alabama and Tennessee iron, and more are expected. One importer has still a good assortment of foreign brands in stock and is holding prices firmly under a good demand. Soft English iron is quoted at \$26.50 to \$27 per gross ton, ex yard, and No. 2 Southern foundry iron for second-quarter shipment at about \$25.

Coke.—The local situation has changed but little, though spot prices are slightly firmer, with decreasing supplies. There is not much business, but no foreign coke is expected to arrive for some months. Importers quote \$15.50 per net ton, ex yard, and Southern foundry coke is quoted at about \$12 per net ton.

Old Material.—The demand for all lines of scrap in local and nearby markets is gradually expanding, with a steady run of fair orders and no excessive offerings. Values show little fluctuation, current quotations being as follows: Cast-iron scrap, per net ton, \$15.50; steel melting scrap, per gross ton, \$12.50; wrought scrap, per net ton, \$12.50 to \$15; rerolling rails, per net ton, \$11.

German Iron Market Less Active

Bar Prices Lower—Pig Iron
and Semi-Finished Steel Scarce

BERLIN, February 7, 1913.

Slower selling and somewhat weaker prices in bars appear to be the most striking features this week. It is now admitted that works in the west are taking contracts at 2 to 3 marks a ton lower than some time ago. On the other hand, foreign buying is still active. As the mills have work for some months ahead, the situation gives no cause for immediate concern. There is still new work coming into sight in ship plates, some orders for large steamers having been announced. A slacker demand is mentioned from the hardware trade, and prices of screws and rivets are reported weak. On the other hand, the iron foundries in the region to the south of Bremen have just raised the price of castings 1 to 2 marks per metric cwt.

A fight against an independent dealer has been opened by the Berlin Association of Bar Iron Dealers, which has resulted in heavy price cutting. For above a week the association has been selling bars in some parts of Saxony at 10 to 15 marks below the general market price. The fight is directed, in fact, at one or two producers in that kingdom which are backing the independent Berlin house; hence the cut prices apply only to the regions supplied by those producers.

Scarcity of Pig Iron and Steel Not Relieved

That the general situation is still excellent may be assumed from the fact that the scarcity of pig iron and semi-finished steel has not been relieved. Great difficulty is reported in obtaining sufficient supplies of hematite pig iron; the furnaces producing this are fully sold out for the rest of this half year. The scarcity in Luxemburg grades is so marked that German consumers are trying to obtain supplementary supplies from the adjacent French and Belgian districts. From the Silesian district it is reported that the output of the furnaces is absorbed so fully by steel and puddling works that only a small remnant is left for export.

Siegerland Ore Advanced

The Siegerland ore producers evidently regard the situation as still very promising. After having raised prices so recently as last October, they have adopted another advance of 3 marks per 10-ton carload for raw brown iron ore and 5 marks for roasted ores. The new prices are 131 and 190 marks, respectively. A year ago these prices were 116 and 165 marks. In other words, the price of raw ores has been raised about 35 cents and roasted ores about 60 cents per ton.

The Silesian district, which consumes about 250,000 tons of Russian ores yearly, is much perturbed over a report that the Russian Government is about to prohibit the export of ores. One of the trade papers, however, is informed from St. Petersburg that the Minister of Commerce denies that a prohibition is contemplated.

The Plate Trade

The Siegerland district reports the plate market as in satisfactory shape. The mills are stipulating 10 to 14 weeks for delivery. For heavy plates they are still demanding 132 to 135 marks on cars, while medium thicknesses command 137 to 140 marks. Work in thin plates is active and only a few mills can deliver in less than 12 weeks; the bottom price ranges between 142 and 147 marks. The Geisweider Eisenwerke, the chief producer of finished products in that district, has recently begun producing with its new mill for heavy and medium plates. Within a few weeks the Bremerhütte will also begin rolling similar products at its new mill in Geisweid. In the Silesian district business in heavy plates is growing duller and prices are easier.

Unsettlement in the Wire Trade

Considerable irregularity in prices is reported from the wire trade. Differences of as much as 2 marks per metric cwt. on ordinary commercial wire are mentioned and it is asserted that prices are in some cases lower than 12 months ago. Hesitancy among buyers is reported, although some large contracts for the spring months are in sight. In wire mills the unsatisfactory situation is apparently growing worse, owing to the competition of Austrian and Belgian producers. A price war is on among the Austrian mills, which makes the situation in Germany the more precarious.

Negotiations for the organization of the wire mills and wire nail producers are still in progress; but nobody, apparently, believes that a positive result will be reached. On the other hand, it is expected that the producers of wire rods will be able to prolong their organization without any particular difficulty.

The efforts to organize the producers of steel castings have broken down and the negotiations have been discontinued, several of the most important concerns having refused to join an organization of the rigid character contemplated.

The Machinery Trade

The rapid development of Germany's exports of machinery in the past four years is evident from the following table:

	Metric tons	Value, marks
1909.....	382,800	501,800,000
1910.....	430,300	596,000,000
1911.....	550,400	704,700,000
1912.....	617,500	783,300,000

In the same time imports rose from 70,500 tons, valued at 93,600,000 marks, to 88,700 tons, valued at 105,900,000 marks. Imports from the United States were larger than from any other country. (All these figures also embrace vehicles, but not electrical machinery.)

At a meeting of the German machine tool builders the chairman pointed out that the exports of machine tools last year showed a gain of 12,500 tons, making a total of 77,000 tons, and that the exports of these goods were heavier than those of any other branch of the German machinery trade. The chairman pointed with apparently deep concern, however, to the fact that the imports of machinery had shown a gain of 1400 tons, which he attributed chiefly to the fact that the import duty on American machine tools is insufficient. He demanded that the various countries give each other reciprocal treatment in the duties on these goods. He estimated that the total sales of the German machine tool industry last year reached 225,000 tons, valued at 225,000,000 marks.

The Belgian market shows some irregularity. Several days ago a further reduction of bars and bands for export by 2 shillings was reported. Plates, on the other hand, were quoted 1 shilling higher than last week.

Unfavorable British Conditions

Marked Decline in Cleveland Pig Iron—Signs of Industrial Reaction

(By Cable)

MIDDLESBROUGH, ENGLAND, February 19, 1913.

In Cleveland pig iron panic conditions in Continental markets, speculative selling and the efforts of long interests to unload have made the position precarious. The copper market has added to the unfavorable influences, as well as politics. Signs of industrial reaction are increasingly apparent. Stocks of warrant iron amount to 238,151 tons, against 230,403 tons last week. We quote as follows:

Cleveland pig iron warrants (closing Tuesday) 60s. 4d. against 64s. 9d. one week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 60s. 9d., a decline of 4s. 6d.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 15s.

German sheet bars, f.o.b. Antwerp, 112s 6d.

German 2-in. billets, f.o.b. Antwerp, 107s. 6d.

German basic steel bars, f.o.b. Antwerp, £5 19s., a decline of 2s.

Steel bars, export, f.o.b. Clyde, £8 5s.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 7s. 6d.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yards, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 6d. against 14s. 7½d. one week ago and 14s. 9d. two weeks ago.

Buffalo

BUFFALO, N. Y., February 18, 1913.

Pig Iron.—Total sales since last week's report are small. Inquiries covering fairly good tonnage have been received; but except in very few instances have not yet resulted in orders. The continued hesitancy is somewhat surprising in view of the fact that consumption keeps up in remarkable volume with the prospect of its increasing as spring opens and it is certain that many users tributary to this market have still to cover for their April requirements, including a number of the larger consumers. The principal buying for the week has been by small foundries for carload lots. Prices are unchanged; we quote as follows for second quarter and last half delivery f.o.b. Buffalo:

No. 1 foundry	\$17.00 to \$17.75
No. 2 X foundry	17.00 to 17.50
No. 2 plain	16.75 to 17.25
No. 3 foundry	16.50 to 17.00
Gray forge	16.25 to 16.75
Malleable	17.25 to 17.75
Basic	18.00 to 18.25
Charcoal, regular brand and analysis	18.00 to 19.00
Charcoal, special brand and analysis	21.75

Finished Iron and Steel.—Specifications on contracts in finished lines have been picking up to a considerable extent in the past few days as compared with the latter part of last week, when a slight falling off was noted. In a few instances mills are reported as catching up somewhat on deliveries; but the majority of producers are making no appreciable gain in this respect and mill books are still sufficiently full of contract orders to absorb capacity output well into the third quarter. Warehouse trade in bars, plates and shapes, has been less than for last week, but mill orders have increased proportionately. New business from regular customers to replace expiring contracts is being readily taken on by the mills at present prices for deliveries subject to mills convenience. Canadian consumers of finished materials have been obliged to import from England more largely in the past thirty days than for some time previously and are now negotiating purchases from abroad. Importation deliveries can be obtained within 6 to 8 weeks from date of placing specifications and prices, figured to include ocean freight and duties, are only slightly higher than the minimum prices being asked in the States. Freight congestion on railroads entering Canada is also interfering with deliveries from this side of the border. Sheets continue active at firm prices with deliveries now extending well beyond the first half. The Lackawanna Steel Company received an or-

der for 10,000 tons of open-hearth rails as its portion of the 1913 requirements of the New York, New Haven & Hartford and other Mellen roads in New England. A good volume of business is being placed in fabricated structural lines. Bids are being received for the steel for a church and school for St. Monica's Church, Buffalo, 100 tons, and contracts have been awarded as follows: 730 tons for the Otis Elevator Company's foundry, Buffalo, to the American Bridge Company; 500 tons for the trestle and coke bins for the Detroit Iron & Steel Company, Detroit, and 150 tons for coal bin and by-product ovens for the Semet-Solvay Company, Cleveland, to the Lackawanna Bridge Company, Buffalo.

Old Material.—General conditions are about the same as reported last week; showing no improvement in demand, consumers as a rule being well stocked in most lines. Business in heavy melting steel and old carwheels remains fairly active, but in borings has fallen off slightly, although not to a sufficient extent to affect prices. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel	\$14.00 to \$14.50
Boiler plate, sheared	15.50 to 16.00
No. 1 bushing scrap	12.00 to 12.50
No. 2 bushing scrap	10.00 to 10.50
Low phosphorus steel	17.00 to 17.50
Old iron rails	15.00 to 15.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles	17.00 to 17.50
Old iron axles	24.00 to 24.50
Old carwheels	15.75 to 16.25
Railroad malleable	13.25 to 13.75
Locomotive grate bars	11.00 to 11.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	10.00 to 10.50
Wrought-iron and soft steel turnings	8.25 to 8.50
Clean cast borings	8.75 to 9.00
Bundled tin scrap	18.00

Boston

BOSTON, MASS., February 18, 1913.

Old Material.—The market is exceedingly dull, few orders being placed, and scrap coming out in very small quantities. Prices have receded again, and the general opinion is that they will be even lower before any great amount of buying takes place. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$10.50 to \$10.75
Low phosphorus steel	13.50 to 14.50
Old steel axles	14.50 to 15.00
Old iron axles	22.50 to 23.00
Mixed shafting	13.50 to 13.75
No. 1 wrought and soft steel	10.75 to 11.00
Skeleton (bundled)	9.00 to 9.50
Wrought iron pipe	10.00 to 10.25
Cotton ties (bundled)	9.50 to 9.75
No. 2 light	4.00 to 4.50
Wrought turnings	7.50 to 7.75
Cast borings	7.50 to 7.75
Machinery, cast	13.50 to 14.00
Malleable	10.50 to 11.00
Stove plate	8.50 to 9.00
Grate bars	7.50 to 7.75
Cast-iron car wheels	15.00 to 15.50

New York

NEW YORK, February 19, 1913.

Pig Iron.—The mood of foundry iron buyers has not changed, and there is no more activity to report than was noted last week; in fact, with some sellers business is lighter. A fair amount of iron was sold in the Buffalo district in the first ten days of the month, some of it for shipment to New York State foundries and less to New England, and there is a rumor, though not in very definite terms, of a sale of basic iron at Buffalo. While for shipment to nearby points Buffalo furnaces have probably obtained \$17.50 for No. 2 iron recently, there is evidence that business has been done as low as \$17 at furnace for distant shipment. Two or three inquiries have come up from New England for third and fourth quarter iron and there are a few inquiries from Canada. It is the exception, however, to find a foundry interested in buying now for delivery in the last half, and most of them appear to be pretty well covered to the middle of the year. In eastern Pennsylvania little business has been reported apart from scattering lots of pipe iron, some of which have been

packed up at pretty close to \$16.25 delivered at Delaware River works, which is about 75 cents below the December basis. Virginia furnaces continue to quote \$15.50 for No. 2 X for first half delivery, and on that basis could undersell Buffalo furnaces at some New England points where water delivery is possible, assuming a quotation of \$17 at Buffalo furnace for No. 2 X. We quote as follows for Northern iron at tidewater: No. 1 foundry, \$18.50 to \$18.75; No. 2 X, \$17.75 to \$18.25; No. 3 plain, \$17.50 to \$17.75. Southern iron is quoted at \$18.50 to \$18.75 for No. 1 foundry and \$17.75 to \$18 for No. 2.

Rails.—Quite a number of scattering rail orders have been placed and the girder rail trade is particularly active. Frog and crossing companies have been very busy and new business has been coming in upon them steadily of late. At Rochester the New York State Railways are inquiring for 1500 tons of girder and T rails. Among orders recently booked by Eastern mills are 500 tons each for the Harbor Commission, San Francisco; Puget Sound Heat, Light & Power Company, and the Susquehanna, Bloomsburg & Berwick Railway. At Portland, Ore., an order has been taken for 2200 tons of girder rails. A trolley line in Maryland is negotiating for 2500 tons T rails. In the past week the Steel Corporation's rail orders have amounted to 23,000 to 24,000 tons. A Southwestern railroad is inquiring for 4700 tons.

Structural Material.—The over-cautious attitude of the financial interests is shown in the absence of speculative building construction in New York, and there is again justification for the claim that active structural building erection takes place in the Metropolitan district only when prices are low. In short, most of the work pending is of the investment sort. Inquiry is still reported active and material is obtained without change in delivery or price. Among the interesting new propositions is an inquiry for 7500 to 7700 tons for the Norfolk & Western for new bridge work on straightening the line and replacing existing bridges. The New York Central is taking bids for a station at Utica, N. Y., requiring about 1000 tons. There are still 600 tons pending for the Boston & Maine, though the Boston Bridge Works has contracted for additional work beyond that reported last week, making a total to this company lately of 460 tons. The Central Railroad of New Jersey is to take 350 to 400 tons for small bridges and it is expected that about 1500 tons will be in the market before long for the Hill Publishing Company, New York. Of recent awards mention may be made of 2700 tons for the Penn Mutual building, Philadelphia, to the American Bridge Company; 1600 tons for the lithographic establishment of Heywood, Strasser & Boight, Ninth avenue and Twenty-sixth street, to Levering & Garrigues Company; 220 tons for stringers for a coal trestle for the Philadelphia & Reading, to the McClintic-Marshall Construction Company, and it is stated that Eidlitz & Ross have the general contract for the Bradstreet printing building, Lafayette and Howard streets. Plain material obtains 1.76c. for mill shipments for delivery in eight to ten weeks, but 1.66c., New York, for delivery in the third quarter. From store the price is 2.25c., New York.

Plates.—Local demand has eased off, deliveries are not so extended, but recent prices are still held, one company still asking \$1 more for universal plates than for sheared. No unusual developments have taken place in car buying. The largest order of the week is 1000 box cars for the Rock Island to be built by the Western Steel Car & Foundry Company. Quotations remain 1.66c., New York, for mill shipments in the third quarter and 1.76c. for shipment in eight to ten weeks.

Bars.—Specifications on steel bar contracts are exceedingly heavy, inquiry for the latter half is strong and considerable contracting has been settled for third and fourth quarters. More than one company is refusing new business and others are selecting the customer and the business with care. In short there is no evidence whatever of a let up in the demands of manufacturers and jobbers. Bar iron continues also in good demand and some mills still ask at least four to six weeks to make delivery of ordinary sections, with bar-iron products still harder to get. Steel bars are quoted at 1.40c., Pittsburgh, or 1.56c., New York, delivered at the convenience of the mill, which is commonly more than three months hence, but they remain 2.10c. from store; shipments in one or two months go at prices between the extremes, though this business does not total very much. Refined iron bars are quoted at 1.70c. to 1.80c., New York, and from store are 2.15c.

Cast Iron Pipe.—Atlantic City, N. J., will open bids February 20 on 2200 tons of 48 in., and Hartford, Conn., will open bids on the same date for 1600 tons

of 6 to 24 in. A great deal of private buying is in progress, the principal demand coming from gas companies, which have placed orders for 1000 tons and upward. R. D. Wood & Co., Philadelphia, have received an order from Brockport, N. Y., for pipe for a new water system at \$24.38 per net ton, delivered, and special castings at 2½c. per lb. The Worcester, Mass., contract for 2600 tons went to the United States Cast Iron Pipe & Foundry Company at \$24.40 delivered. The same company received the contract for Beverly, Mass., at \$26, delivered, for 4 in., \$25 for 6 and 8 in. and \$24.50 for 12 in. Quotations on carload lots of 6 in. are \$25 to \$25.50 per net ton, tidewater.

Old Material.—Transactions are few. A sale of 500 tons of heavy smelting steel scrap is reported at \$13.25, eastern Pennsylvania, but other consumers in that territory are refusing to pay more than \$13. Foundries are buying only small quantities of cast scrap, being unwilling to take any considerable quantity under existing conditions. Some demand for cast scrap is coming from one or two consumers in eastern Pennsylvania. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	.....	\$11.00 to \$11.50
Heavy melting steel scrap	.....	11.00 to 11.50
Relaying rails	.....	22.50 to 23.00
Rolling rails	.....	14.00 to 14.50
Iron car axles	.....	24.00 to 24.50
Old steel car axles	.....	16.00 to 16.50
No. 1 railroad wrought	.....	13.00 to 13.50
Wrought iron track scrap	.....	12.50 to 13.00
No. 1 yard wrought, long	.....	12.00 to 12.50
No. 1 yard wrought, short	.....	11.00 to 11.50
Light iron	.....	5.00 to 5.50
Cast borings	.....	8.00 to 8.50
Wrought turnings	.....	8.25 to 8.75
Wrought pipe	.....	10.25 to 10.75
Old car wheels	.....	15.00 to 15.50
No. 1 heavy cast, broken up	.....	11.50 to 12.00
Stove plate	.....	8.75 to 9.25
Locomotive grate bars	.....	8.00 to 8.50
Malleable cast	.....	11.00 to 11.50

Ferroalloys.—Quotations by first hands for 80 per cent. ferromanganese are unchanged at \$65, Baltimore, for all positions, in a market that is quiet. Resale lots can still be had at under \$65, but not in large quantity. The situation in 50 per cent. ferrosilicon is unchanged at \$75 for carloads, \$74 for 100 tons, and \$73 for 600 tons and over.

Metal Market

NEW YORK, February 19, 1913.

The Week's Prices

	Copper, New York.						Lead		Spelter		
	Copper, New York.		Tin.		New York.		St. Louis.		New York.		
Feb.	Lake.	Electrolytic.	Electrolytic.	New York.	New York.	New York.	St. Louis.	St. Louis.	New York.	New York.	St. Louis.
13.....	16.00	15.75	48.85	4.35	4.20	6.50	6.35				
14.....	15.00	14.87½	48.90	4.35	4.20	6.40	6.25				
15.....	15.00	14.87½	49.00	4.35	4.20	6.40	6.25				
17.....	15.00	14.87½	49.00	4.35	4.20	6.40	6.25				
18.....	15.00	14.87½	48.75	4.35	4.20	6.35	6.20				
19.....	15.00	14.87½	49.25	4.35	4.20	6.35	6.20				

Copper, at lower prices, is again quiet, after good buying. Tin prices have changed but slightly and there has been a little activity. Lead is unchanged. Spelter is lower, weak and dull. Antimony has declined, with little or no interest taken.

New York

Copper.—The feature in copper since the last report was the lowering of prices by all large sellers on Friday to 15c. for both Lake and electrolytic. On Thursday the market had been irregular with no business stirring but action immediately followed the decline. The reduced prices meant 15c. cash for Lake and 15c. delivered, cash, 30 days, for electrolytic, which is equal to 14.87½c., cash, New York. At this last named figure a very large number of consumers entered the market and sales heavy in the aggregate were made, although it is not believed that any one consumer bought any very large quantity. Most of the sales were for quick delivery and it is estimated that between 50,000,000 and 60,000,000 lb. changed hands. One disappointing feature of the long looked for movement was that Europe did not take hold to any great extent. Foreign consumers have done comparatively little buying since they purchased heavily a few weeks ago. While good shipments of copper have been going abroad, there is a well defined idea that some of this metal is going to the other side to be held in reserve and in readiness for European activity when it does come. A cheering feature of the present market is that American consumers are keeping busy despite the fact that they have let their stocks run very low. A minor feature of the market at present, which is not regarded with favor by sellers for the reason that in sufficient volume it has a

breaking down effect, is the fact that some holders of resale copper if pressed hard enough will shade prices a few points. The price to-day is unchanged from that of last Friday. London quotations are £64 5s. for spot and £64 2s. 6d. for futures. The exports this month total 18,779 tons.

Pig Tin.—There has not been much of interest in tin in the last few days. Sales amounting to about 200 tons, mostly for nearby delivery, were made on Friday, the activity being stimulated by a threatened shortage in February tin and the desire to cover some unprotected contracts. The result was to send the price up to 49c., which prevailed Saturday and Monday. While it is now believed there will be sufficient tin to go around in February, there will not be over much considering the good consumption and the fact that all the shorts are not yet covered. Yesterday there again was fair buying, but almost altogether for future delivery. The decline of London prices in the last few weeks is attributed to bear selling. The price of tin in New York to-day is 49.25c. and the London quotation is £220 10s. for spot and £215 15s. for futures. The arrivals in February amount to 2530 tons and there is afloat 3370 tons.

Lead.—The market continues dull, drifting along without incentive to change. The New York price is 4.35c. and that in St. Louis, 4.20c.

Spelter.—Extreme dullness in new business, together with declining prices, seems to be all there is to say regarding this metal. Considerable quantities, including some foreign spelter, are going into consumption, the foreign metal in particular being used by galvanizers. Prices declined fully 15 points in the last week and quotations to-day are 6.35c., New York, and 6.20c., St. Louis, with an occasional premium of a few points paid for quick delivery.

Antimony.—This market is practically lifeless and further declines are shown. The import price of Hallett's is 8.87½c., having been offered at that figure, but it is selling down to 8.75c. Cookson's is quoted at 9c. to 9.25c., and Chinese and Hungarian grades at 8.25c. to 8.50c.

Old Metals.—The market is weak. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	14.75 to 15.00
Copper, heavy and wire	14.00 to 14.25
Copper, light and bottoms	12.75 to 13.00
Brass, heavy	9.25 to 9.50
Brass, light	7.75 to 8.00
Heavy machine composition	13.00 to 13.25
Clean brass turnings	8.50 to 8.75
Composition turnings	11.50 to 12.00
Lead, heavy	4.00
Lead, tea	3.75
Zinc, scrap	5.25

Chicago

FEBRUARY 18.—Prices for spot copper have been subject to considerable variation, with concessions generally obtaining. Quotations for April and May delivery are somewhat firmer. Tin prices are also lower, likewise sheet zinc. The demand for scrap metals is negligible and prices offered are lower. We quote as follows: Casting copper, 15.50c.; Lake, 16c., in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 50c.; small lots, 52c.; lead, desilverized, 4.30c. to 4.35c. for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.45c.; Cookson's antimony, 11.25c., and other grades, 10.50c. in small lots; sheet zinc is \$8.50, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 13.50c.; copper bottoms, 12c.; copper clips, 13c.; red brass, 12c.; yellow brass, 9c.; lead pipe, 3.80c.; zinc, 4.35c.; pewter, No. 1, 33c.; tinfoil, 39c.; block tin pipe, 45c.

St. Louis

FEBRUARY 17.—There has been a further softening in copper prices, but some improvement is observed in the tone of the spelter market. Quotations are as follows: Lake copper, 15.60c.; electrolytic copper, 15.35c.; tin, 49.20c. to 49.60c.; antimony, Cookson's, 9.75c. to 9.85c.; lead, 4.22½c.; spelter, 6.22½c. to 6.25c. In the Joplin ore market during the week zinc ore was in stronger demand, although the choice grades did not bring much more than in the week previous. In the second grades little was sold for less than \$44 per ton. The basis price ranged up to \$48 and the choice grades sold as high as \$51. Prior to the recent decline in prices the offerings were unusually strong and a heavy tonnage of ore was spoken for in advance of production. In some instances the mines are now selling ore that sold a number of weeks ago for a basis figure greatly

in excess of the existing prices. The price of calamine ranged from \$25 to \$27, assay basis of 40 per cent., while the choice grades sold as high as \$30. For lead ore the best price reported paid was \$53.50 for 80 per cent. In miscellaneous scrap metals we quote as follows: Light brass, 6.50c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 13c.; pewter, 25c.; tinfoil, 36c.; zinc, 4c.; lead, 3.50c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, February 19, 1913.

The stock market has been under pressure from a number of unfavorable influences, such as the imminence of a firemen's strike on the Eastern railroads, the continued unsettled state of affairs in Europe, scarcity of money, and the demoralization of the copper trade and heavy declines in copper securities. Certain stocks have declined for special causes, as, for instance, the Rumely stocks, which fell sharply on the announcement of an issue of notes for \$10,000,000. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Am. Can. com.	38¾-41¾	Nat. En. & St. com.	17-17½
Am. Can. pref.	123½-125	Nat. En. & St. pref.	87-92
Am. Car & Fdy. com.	50¾-52¾	Pressed Steel com.	31¾-32½
Am. Car & Fdy. pref.	115-115½	Pressed Steel pref.	98¾-99
Am. Loco. com.	36¾-38½	Railway Spring com.	30-31½
Am. Loco. pref.	105-105½	Republic com.	24¾-25½
Am. Steel Foundries	35½-38	Republic pref.	84-86½
Bald. Loco. com.	48½-49	Rumely Co. com.	78-81½
Bald. Loco. pref.	103¾-104¾	Rumely Co. pref.	92½-95
Beth. Steel com.	35-36¾	Pipe com.	14¾-15
Beth. Steel pref.	65¾-66	U. S. Steel com.	60¾-63½
Case (J. I.) pref.	102-102½	U. S. Steel pref.	108-108¾
Colorado Fuel	33½-36¾	Va. I. C. & Coke	50-52½
Deere & Co. pref.	99½-100	Westinghouse Elec.	69¾-71½
Emer-Brant com.	65-66½	Chic. Pneu. Tool.	49¾-51
Emer-Brant pref.	96-96½	Cambria Steel	49¾-50½
General Electric	138¾-140½	Lake Sup. Corp.	28½-28¾
Gr. N. Ore Cert.	34¾-37½	Warwick	109¾-110¾
Int. Harv. com.	108-111½	Crucible Steel com.	16-16½
Int. Harv. pref.	112½-113	Crucible Steel pref.	92¾-94
Int. Pump com.	13½-13¾	La Belle Iron com.	49-60½
Int. Pump pref.	57-58½	La Belle Iron pref.	125-137
Lackawanna Steel	47¾-48¾		

The directors of the M. Rumely Company, La Porte, Ind., have authorized an issue of \$10,000,000 6 per cent. convertible notes running two years from March 1, 1913. They will be convertible into common stock from September 1, 1913, until December 1, 1914, and are callable at par and interest with premium of one-half of 1 per cent. for each full six months or for any part of such period between time of redemption and the due date, March 1, 1915. The stockholders will be given rights to subscribe to the issue. The common shares have been increased from \$12,000,000 to \$22,000,000 to provide for conversion of the notes.

The Brier Hill Steel Company, Youngstown, Ohio, is issuing the remainder of its treasury preferred stock, which will raise its stock issue to \$5,000,000 7 per cent. cumulative preferred and \$10,000,000 common. In a statement as of December 31, 1912, it shows surplus of \$433,914. Its quick assets were \$3,767,545, and its current liabilities \$312,630. The net earnings for the six years ended with 1912 are said to have averaged \$1,400,000 a year.

Dividends Declared

The Niles-Bement-Pond Company, regular quarterly, 1½ per cent. on the preferred stock, payable February 15, and 1½ per cent. on the common stock, payable March 21.

The Pratt & Whitney Company, regular quarterly, 1½ per cent. on the preferred stock, payable February 15.

The Wheeling Steel & Iron Company, regular quarterly, 2 per cent., payable March 1.

Deere & Co., regular quarterly, 1¾ per cent. on the preferred stock, payable March 1.

The Harbison-Walker Refractories Company, regular quarterly, ½ of 1 per cent. on the common stock, payable March 1.

The General Electric Company, regular quarterly, \$2 per share, payable April 15.

In the United States District Court at Detroit, Mich., February 15, fines were imposed, ranging from \$1 to \$10,000 on 14 individuals and 13 corporations, manufacturers of enameled bath tubs, convicted for criminal conspiracy in restraint of trade. The fines totaled \$51,007, and must be paid on or before March 1. The combination was dissolved last November by the Supreme Court in a civil suit instituted in Baltimore. The criminal case just determined was a retrial, the first trial having resulted in a disagreement.

Personal

Wallace W. Scott, for some years connected with the sales department of the Philadelphia office of the Carnegie Steel Company, has been transferred to the company's structural bureau at Pittsburgh, and will give his attention to the sale of steel carwheels and axles.

Arthur Reiche, general manager of the Orenstein-Arthur Koppel Company, Pittsburgh, is now at the company's head offices in Berlin, Germany, in consultation regarding extensive additions and improvements which are to be made to its plant at Koppel, near Beaver, Pa. The general offices are to be removed in a short time from the Machesney Building, Pittsburgh, to the works at Koppel.

C. D. Smith, engineer, United States Bureau of Mines, Pittsburgh, Pa., presented a paper on "Gas Producers and Producer Gas," before the Cleveland Engineering Society on Tuesday evening, February 11, in the Chamber of Commerce Building, that city. James H. Herron, manager of the National Machine Tool Builders' Association, is chairman of the programme committee.

Prof. Albert Sauveur, Cambridge, Mass., delivered an illustrated lecture on "The Metallography of Iron and Steel" at Franklin Institute, Philadelphia, February 13.

Franklin H. Wentworth, of Boston, secretary of the National Fire Protection Association, was the guest on Monday of the Engineers' Club, the Architectural Club, the City Club and the St. Louis Chapter of the American Institute of Architects at St. Louis, making addresses before all the organizations.

F. A. Leischman, formerly manager of the Edwardsville radiator plant at Edwardsville, Ill., has been engaged as superintendent of the Dunkirk, N. Y., plant of the United States Radiator Company. He succeeds E. C. Nigg, who resigned several months ago.

Sanderson & Porter, engineers, 52 William street, New York, announce that Richard S. Buck has retired from the firm, becoming chief engineer of the Dominion Bridge Company, Canada, and that Seton Porter has been admitted as a member of the firm.

W. D. Waltman, president of the Natrona Pipe Line & Refinery Company, Casper, Wyo., has been in New York on a brief visit. Mr. Waltman was for five years engaged in engineering work on the Panama Canal, spending two years at Culebra and three years at Porto Bello. The company of which he is now the head, and which was organized two years ago with French capital, is producing 4000 barrels of oil per day from flowing wells and refining 3000 barrels per day. The crude oil is piped from the Salt Creek field to Casper, a distance of 50 miles.

J. E. Dailey, chief civil engineer of the Brier Hill Steel Company, Youngstown, Ohio, has been made assistant to Barton R. Shover, general superintendent.

E. E. Goodwillie has been appointed a member of the Pittsburgh sales office of the Pennsylvania Steel Company, succeeding Roy M. Leachaler, resigned.

Dublin Barrett has been appointed superintendent of the Demmler and Monongahela works of the American Sheet & Tin Plate Company.

H. D. Wilson, vice-president Wilson-Snyder Mfg. Company, Pittsburgh, has also been made general manager. Benjamin F. Harris, now secretary Dravo-Doyle Company, Pittsburgh, will become sales manager of the Wilson-Snyder Mfg. Company March 1.

J. I. Andrews, general manager of sales of the American Sheet & Tin Plate Company, Pittsburgh, has sailed for Panama.

Charles M. Bigger, Cincinnati manager of the Vanadium Alloys Steel Company, will make an address February 27 before the Foremen's Club (metal trades), Dayton, Ohio.

Gen. Otto H. Falk, for three years president of the Merchants' & Manufacturers' Association of Milwaukee, Wis., and who was obliged to decline re-election for the fourth time because of the press of private business, has been elected a director for three years. He is vice-president of the Falk Company, Milwaukee, and receiver of the Allis-Chalmers Company. It is stated that he will be elected president of the Allis-Chalmers Company upon its rehabilitation.

Frank N. Grigg, formerly associated with the Adams & Westlake Company, Chicago, as Eastern representative, has become connected with the Standard Heat & Ventilation Company, Inc., as district manager, with offices at Washington, D. C.

C. H. Domhoff, Domhoff & Joyce Company, Cincinnati, Ohio, has gone on an extended pleasure trip to the Pacific coast.

H. B. Crile, formerly with the Massillon Rolling Mill Company, but who has been representing the Canton Art Metal Company, Canton, Ill., in Virginia and West Virginia, has been transferred to Pennsylvania. Frank Kiley, who has been employed in the company's office for several years, succeeds Mr. Crile in Virginia and West Virginia.

Joseph L. Mishler has severed his connection with the Kelly Foundry Company, Goshen, Ind., to become associated with the Goshen Novelty & Brush Company.

W. A. Riddell, general superintendent of the foundry department of the Otis Steel Company, Cleveland, Ohio, has tendered his resignation to take effect March 1.

Obituary

EDWARD L. CLARK, for many years auditor of the General Electric Company, died at his home in Schenectady, N. Y., February 15, after a lingering illness, aged 64 years. He was born in Edinburgh, Scotland, and for several years was employed by the Telephone Company of London with Samuel Insull and others now considered pioneers in the electrical industry. In 1884 he came to America and was employed by Thomas A. Edison as auditor of the Edison Electric Light Company in New York City, one of the first electric light stations in the world. In December, 1891, he became auditor of the Edison General Electric Company. He had full charge of the arduous work of consolidation of accounts when the General Electric Company was organized in 1892 by merging the Edison General Electric Company and the Thomson-Houston Electric Company. Two years later he was made assistant to the comptroller, the late J. P. Ord, and soon thereafter was made general auditor of the company. He leaves a widow and two sons.

GEORGE W. MAYNARD, a prominent chemist and mining engineer, died February 12 at the home of his daughter, Mrs. F. Schnyler Matthews, Cambridge, Mass., aged 73 years. His business office had been at 20 Nassau street, New York City. He was at one time a teacher in the Rensselaer Polytechnic Institute, Troy, N. Y. He had the distinction of being the first chemist regularly employed at an iron works in this country, his connection at the time having been with the Rensselaer Iron Works of John A. Griswold & Co., Troy, N. Y., in 1859. He introduced the Thomas basic steel process in this country. He was a member of the Iron and Steel Institute, London; of the American Institute of Mining Engineers, and of the Engineers' Club, New York.

WILLIAM ROSS, president Ross Gear & Tool Company, Lafayette, Ind., maker of automobile gears, is dead at the age of 68 years.

THEODORE H. MORRIS, of the firm of Morris, Wheeler & Co., iron and steel merchants, Philadelphia, Pa., died February 15, aged 73 years. He had long been identified with the iron and steel trades.

The Southern Wheel Company

The Southern Wheel Company, with main office at St. Louis, Mo., has been incorporated under the laws of Georgia with a capital stock of \$2,500,000, with privilege to increase to \$5,000,000. It took over, February 1, the properties of the St. Louis Car Wheel Company, Decatur Car & Mfg. Company and Atlanta Car Wheel Company, operating plants at St. Louis, Birmingham, Atlanta and Savannah. All are in successful operation, making chilled iron wheels and general castings. S. F. Pryor, St. Louis, is president, and J. J. Morse, St. Louis, is secretary and treasurer. Otis H. Cutler, president of the American Brake Shoe & Foundry Company, New York, is chairman of the board of directors.

Pittsburgh and Vicinity Business Notes

A project is reported under way to build an open hearth steel plant at Leetonia, Ohio, where the blast furnace of the Salem Iron Company is located. It is said that O. W. McKeefrey, the principal owner of the blast furnace, is interested.

A carload of some of the largest Harveyized steel plates made, about 10 by 16 ft., was received at the Arsenal Station in Pittsburgh by the Bureau of Mines last week. The plates are 6 in. thick, and are pierced in numerous places, and after being tested at the Government proving grounds at Indian Head, Md., were rejected. They will be used to cover the tops of pits where experimental mine explosions will be made.

The report that the Aluminum Company of America, New Kensington, Pa., will build a large addition to its plant in Arnold, an adjoining borough, and that Stone & Webster had been given the general contract for the work, is officially denied. The company has bought a small piece of ground adjoining its works, but has made no plans whatever for using it.

The report that the Standard Chain Company, Pittsburgh, is building a new plant at Chillicothe, Ohio, to be put in operation about March 1, is incorrect. It has no plant and no interests whatever at that place.

A. M. Byers & Co., Inc., Pittsburgh, manufacturers of wrought iron pipe, will build a new galvanizing plant adjacent to their pipe mills on the South Side in that city. The plans have been made by F. Felkel & Sons, May Building, Pittsburgh, and the structural steel will be furnished by the Pittsburgh Bridge & Iron Company.

The Latshaw-Bradley Machinery Company, People's Bank Building, Pittsburgh, has taken the account of the Clarke & Norton Company, Wellsville, N. Y., manufacturer of direct-connected gas-driven compressors suitable for oil and gas field operations and for extracting gasoline from natural gas, also four-cycle gas and gasoline engines up to 100 hp.

The offices of Alex Laughlin & Co. and the Central Tube Company, identified interests, will remove about March 15 from the Lewis Block to the nineteenth floor of the First National Bank Building, Wood street and Fifth avenue, Pittsburgh.

American Rolling Mill Company's Salesmen

The annual reunion of the American Rolling Mill Company's salesmen was held last week at the home office at Middletown, Ohio. The meeting was for social and educational purposes. From an educational standpoint, unusual interest was aroused by the presentation of several new specialties which the company will present in the course of the coming year. The salesmen have been most carefully chosen. They are required to take a course in mill practice before going on the road so that they may have a full and complete knowledge of the various products manufactured by the company. Its complete research department and its corps of efficient engineers are at the disposal of all of these salesmen. A group picture taken on this occasion shows that the force numbers 25.

The Milwaukee Metal Trades and Founders' Association elected Theodore Vilter, president Vilter Mfg. Company, Milwaukee, Wis., as its president for 1913 at the annual meeting and banquet held in the Hotel Pfister on the evening of February 14. Donald Fraser, vice-president and superintendent Chain Belt Company, was elected vice-president. William J. Fairbairn was re-elected secretary and treasurer and manager of the association bureau, 32 Hathaway Building. The banquet took the form of a cabaret entertainment. E. J. Kearney, of Kearney & Trecker, presided as toastmaster. Rev. William T. Dorward of Tabernacle Baptist Church, delivered an address which struck the members so forcibly that he was elected chaplain of the association, "with full powers to take such steps as he sees fit for the reformation of any and all members."

Bids on armor plate for the new dreadnought Pennsylvania opened by the Navy Department February 18 ranged from \$453 a ton by the Midvale Steel Company to \$455 by the Carnegie Steel Company. The Bethlehem Steel Company came between with \$454.65.

The Prospective Tin Plate Consolidation

Little progress has been made in the proposed consolidation of a number of leading tin plate plants in the Pittsburgh district with the La Belle Iron Works of Steubenville, Ohio. On Monday, February 17, a meeting of directors of the La Belle Iron Works was held, at which it was decided to submit to the stockholders for their decision the question of selling the entire property of the company on the basis of \$1.40 a share for the preferred stock and \$60 for the common, the entire amount of \$20,000,000 to be paid in cash. The impression is that the stockholders will not ratify this proposition. The La Belle Iron Works has been run very profitably. For some years the company has been paying 8 per cent. annual dividends on its stock, and since the recent increase was made to \$10,000,000 preferred and \$10,000,000 common, a 2 per cent. dividend has been paid on the common stock.

The project as it stands to-day is to consolidate into one company the Phillips Sheet & Tin Plate Company, with 43 sheet and tin mills, the McKeesport Tin Plate Company, with 22 tin mills, the Washington Tin Plate Company, with six tin mills, and the Carnahan Sheet & Tin Plate Company, with seven sheet and tin mills, and the La Belle Iron Works. The proposed capital is given as \$60,000,000 or \$65,000,000, and it is stated that E. P. Crawford, president of the McKeesport Tin Plate Company, is slated to be the president of the new company if the project goes through. The fact that the stockholders of the La Belle Iron Works will insist on all cash may have the effect of blocking the deal or at least holding it up for a time.

The Rogers-Brown "Movies" Shown in New York

"From Mine to Molder," the motion pictures of Rogers, Brown & Co., which depict the mining of iron ore, operations of blast furnaces and processes in steel production down to steel rail making, and which are now almost famous, were shown on the evening of February 18 to an audience of 800 in the auditorium of the Engineering Societies Building, New York. Among those present were residents of at least four States and representatives of several large corporations whose heads were anxious that as many of their employees as possible should see the pictures. There were present officials and employees of the United States Steel Corporation, International Steam Pump Company, General Electric Company, American Locomotive Company, American Brake Shoe & Foundry Company, New Jersey Zinc Company and others. The pictures and the explanatory lecture of H. B. B. Yergason, of the Cincinnati office of Rogers, Brown & Co., were accorded the applause and favorable comment they have received wherever shown. A graceful introductory address was made by A. A. Fowler, New York resident partner of the firm, as to the purpose of the films. The evening was further made more enjoyable by Noah H. Swayne, 2d, Philadelphia manager, who gave a number of songs so splendidly that he was obliged to respond to several encores, and then the audience wanted to hear more.

Algoma Steel Company Extensions.—The Lake Superior Corporation has had under consideration recently a programme of new construction at the Sault Ste Marie, Ont., plant of its subsidiary the Algoma Steel Company. A new blast furnace has been talked of, also additional open hearth capacity, some extension of the coke plant and a new rail mill. Details have not been decided upon, but the improvements would make more than a 50 per cent. increase in the capacity of the steel works.

The Otis Steel Company, Cleveland, Ohio, has engaged the United Foundry & Engineering Company, Pittsburgh, Pa., to prepare preliminary plans and estimates for its new steel plant to be built in Cleveland, a site for which was recently purchased in the Cuyahoga River valley. After the completion of these plans and their adoption, all orders for equipment will be placed by the Otis Company on a competitive basis, thus giving the different makers of steel plant equipment an equal chance for the contracts.

American Institute of Mining Engineers

The American Institute of Mining Engineers held its 104th meeting for the reading and discussion of professional papers on February 17, 18 and 19 in the Engineering Societies Building, New York. One of the features of the meeting was the reservation of both Wednesday morning and afternoon for papers on iron and steel metallurgy under the auspices of the Iron and Steel Division, but a report of these sessions will have to go over to the next issue. Incidentally, at this writing, the contributions to the question of solid steel ingots promise to make the iron and steel meeting one of epoch making importance.

On Tuesday, at the annual meeting, the following officers were elected and will work under a new constitution which has just been adopted: President, Charles F. Rand; past presidents, Charles Kirchhoff and James F. Kemp; vice-presidents, Karl Eilers, Waldemar Lindgren, B. B. Thayer, S. J. Jennings, T. H. Leggett and F. W. Denton; directors, W. J. Olcott, C. S. Robinson, E. L. Young, J. A. Holmes, J. W. Finch, J. W. Richards, E. P. Mathewson and L. D. Ricketts. R. W. Hunt and James Gayley were also elected directors to fill the unexpired terms of Charles F. Rand and James F. Kemp. In addition to the directors elected at the meeting, James Douglass, Albert R. Ledoux, Edmund B. Kirby and George C. Stone of the old board of directors will fill their unexpired terms in the new board in accordance with the amended certificate of incorporation adopted last November.

American Engineers for Australian Steel Plant

Tadd & Baker, Inc., Philadelphia, are engineers for the steel plant to be built by the Broken Hill Proprietary Company, Ltd., near Newcastle, New South Wales. Several American firms will figure an equipment but no contracts have been let as yet. The plans of the Australian company as given by London engineering journals include by-product coke ovens, a blast furnace of 350 tons daily capacity, three 65-ton open-hearth furnaces, a blooming mill, and a rail mill. This plant will be capable of producing 400 tons of rails a day, or 120,000 tons a year. Later it is proposed to add sheet and rod mills and wire-drawing plant, and to manufacture both black and galvanized sheets and wire. The company now owns a site of 230 acres at Newcastle, which is in close proximity to coal fields, and it has leased 34 acres of water frontage from which the Government has undertaken to dredge and to maintain a channel to the sea 500 ft. wide and 25 ft. deep. The company also owns a large deposit of iron ore at Iron Knob, 33 miles from the coast of Spencer Gulf, some of which has shown over 65 per cent. metallic iron.

Steel Corporation Extension

Appropriations amounting to about \$600,000 have been made by the United States Steel Corporation for large extensions to the Cuyahoga works of the American Steel & Wire Company at Newburg, Cleveland. The product of this plant is cold-rolled specialties, particularly flat wire and spring stock.

At the Mercer works of the American Sheet & Tin Plate Company at Farrell, Pa., a number of new hot mills will be built and extensive improvements carried out which will involve an expenditure of about \$500,000.

The Steel Corporation has made application to the Canadian Parliament for permission to incorporate a separate municipality taking in the land it has acquired in Ontario opposite Detroit, and on which on the opening of spring construction work will begin on a large scale.

John H. Patterson, president National Cash Register Company, Dayton, Ohio, was sentenced by the United States District Court at Cincinnati, February 17, to serve one year in jail and to pay a fine of \$5,000 for violation of the Sherman anti-trust act. Twenty-eight other officials and employees of the company were given jail sentences varying from three months to one year and ordered to pay the costs of the prosecution. An appeal was taken to the Circuit Court of Appeals. The fact was brought out in the course of the trial that the company had a competition department, whose sole duty was to prevent the sale of goods by competitors.

The Elizabeth Industrial Exposition

The Elizabeth Industrial Exposition, held from February 10 to 15 in the Second Regiment Armory, was the initial effort of the Board of Trade of Elizabeth, N. J., to show the many local lines of industry and the importance of that city as an industrial center. There are about 200 different lines of manufacture having factories in Elizabeth and its suburbs, and as many as space would permit were represented. The exhibits of machinery shown were of considerable interest to the general machinery trade as they covered a wide range from sewing machines to power equipment.

The Singer Mfg. Company's exhibit showed the progress of the manufacture of sewing machines from the first machine ever built, its plant at Elizabethport being said to be the largest of its kind in the world. The A. & F. Brown Company, Elizabethport, exhibited friction clutch pulleys, gears, shafting, etc. The Bell Electric Company, Garwood, N. J., showed a number of examples of self-starting and other standard electric motors. The Diehl Mfg. Company, Elizabethport, had an exhibit of like character. The display of the American Gas Furnace Company, Elizabeth, was of particular interest, as it demonstrated the use of gas as a fuel and many appliances by which metal products are hardened and tempered. S. L. Moore & Sons, Inc., Elizabeth, showed their latest development in oil engines. The foundry trade was represented by the Moore Bros. Company, Elizabeth; the house heating furnace trade by the Thatcher Furnace Company, Garwood, and the Boynton Furnace Company, Jersey City, and the small tool industries by the exhibits of the American Swiss File & Tool Company and the Braunsdorf-Mueller Company, both of Elizabeth. Among other exhibits of much interest was that of the printing trades which had a complete printing plant in action and published a daily bulletin of the exposition. The exposition attracted much attention among manufacturers and marks the beginning of a new era in the history of the city.

Milliken Brothers, Inc., New York, fabricators of structural steel, were petitioned into bankruptcy February 11 by creditors. Forsythe Wickes and Francis Dykes were appointed receivers. This is the second time this establishment has been in bankruptcy. After the first failure, several years ago, a reorganization occurred and the present company was formed, assuming a large part of the old obligations. The recent receivership became necessary by the fact that the company was not in position to pay a maturing sinking fund installment of \$300,000 and the February 1 interest on its first mortgage bonds. The liabilities are stated to consist of \$3,000,000 in first mortgage bonds, \$3,600,000 in 10-year non-interest bearing notes and a floating debt of \$500,000. The business is to be continued under the receivership, the court having given permission for the issuance of \$100,000 of receivers' notes for that purpose. Francis Dykes will continue in immediate charge of operations.

Molders' Strike at Erie, Pa.—A number of the machinery foundries at Erie, Pa., are involved in a molders' strike which has considerably reduced working forces, though the proprietors have secured a sweeping injunction order forbidding pickets to interfere with the workers who have taken their places. The foundries at Erie have been for the most part operated as open shops. The demand made by the strikers is not for recognition of the union but for the elimination of handy men and to a large extent for doing away with apprentices.

The National Industrial Traffic League has taken steps to increase the efficiency of its work by opening headquarters in room 413, Tacoma Building, 5 North La Salle street, Chicago, Ill., and has engaged D. P. Chindholm as assistant secretary in charge of the office. All correspondence concerning the league is to be addressed to the assistant secretary.

Recent specifications issued by Corrigan, McKinney & Co., Cleveland, in connection with the steel plant they are to build in that city call for bids on a structural mill and two bar mills, in addition to the contemplated plant already mentioned.

The Machinery Markets

In several localities well-sustained business is shown by the machinery trade, despite an absence of any really big transactions, and everywhere activity is of an encouraging trend. The prevalence of scattered and miscellaneous trading is general. Business has been fair in New York but nothing of exceptional interest has developed. In Philadelphia the bulk of sales has been of single tools or small groups. In New England orders have been well sustained as regards volume and January is said to have equalled that of a year ago. In this territory it is pointed out that deliveries of machine tools are not improving. Cleveland had a good week and the prospects are promising and it is noted that the export demand for turret lathes has been especially good. In Cincinnati the general trend, despite some irregularities, is in the right direction and plants are busy. Woodworking equipment for export is in demand. Detroit did an average volume of business and inquiries are coming out in good number. In Chicago the outlook for the spring is regarded as very good because of the many plans for expansion which are contemplated, while current sales are good. In the Central South, with no unusual demand, trade has been fair. New enterprises in the South have led to better demand in Birmingham for iron ore and coal handling equipment. In St. Louis the last 10 days brought an improvement. Heavy rains have interfered with outside developments in Texas but the rainfall will be beneficial to early crops and help along later activity. On the Pacific coast trade is unusually active for the season, due in part to the refitting of the Alaskan salmon fisheries. The Paymaster General of the Navy Department, Washington, has issued additional lists for machine tools comprising 30 items which are to be opened February 25.

New York

NEW YORK, February 19, 1913.

Nothing of exceptional interest developed in the New York market last week. Most of the sellers received a sufficient number of comparatively small orders to make a fairly good aggregate of sales. It is generally admitted that the trade would like to be doing better but no complaint is heard and various prospects are regarded hopefully. In the case of one or two machine tool houses business was brought up to a pleasing figure by the placing of fairly large orders. While new enterprises requiring machinery and large extensions to existing plants are not a present factor in the New York market to any considerable degree, there are a few projects of this kind which are expected to take shape in the spring. There continues considerable steady buying by large and well established manufacturing companies, while the railroads continue to buy intermittently. The Baltimore & Ohio Railroad has issued a request for bids on one four-spindle automatic screw machine, 2 1/4-in. capacity; one single spindle, 3 1/4-in.; and one single spindle, 4 1/4-in.; also one 3 x 36-in. turret lathe, all to be motor driven. The Tidewater Oil Company is also in the market for a 2 1/2-in. turret lathe. A number of dealers and representatives report that deliveries of machine tools show little or no improvement and that in the case of some types of machine tools deliveries must be far off, a situation which in several instances has determined the direction in which orders were placed.

The Balbach Smelting & Refining Company, Newark, N. J., has had plans prepared for an addition to its plant, 110 x 210 ft., one story. The building will provide for a number of furnaces for treating lead and will be constructed of steel and corrugated iron. The construction contract has been awarded to the Berlin Construction Company.

The Diehl Mfg. Company, Elizabethport, N. J., has acquired 12 1/2 acres of ground fronting on Frelinghuysen avenue and the Pennsylvania Railroad. The company has had plans prepared for its factory No. 2, work on which will be begun some time in April.

The Globe Art Company, Newark, N. J., manufacturer of silver deposit ware, is erecting a three-story factory building at 45 Winthrop street, at an estimated cost of \$8000.

The City Council of Asbury Park, N. J., will open bids March 1 for the construction of an addition to the pumping station, installing new equipment and laying distributing mains, to cost \$275,000. R. L. Savage is city engineer.

The Steiber Iron Works, the Bronx, New York, contemplates the erection of a two-story brick and steel factory building, 50 x 100 ft., at Jackson avenue and St. Mary street.

The Lake Shore Electric Light & Power Company, Westfield, N. Y., has been incorporated with a capital stock of \$25,000 to generate and sell electric current for power and lighting purposes. The directors are Eugene L. Falk and W. M. Scott, Buffalo, and L. I. Ottaway, Westfield.

James Sweeney, Jr., president of the Sweeney Indus-

trial Properties, North Tonawanda, N. Y., is having plans prepared for a factory building for the Niagara Sled Company, lessees.

George Sheldon and Edgar Knapp, Middleport, N. Y., have organized a company with a capital stock of \$50,000 and will erect and equip a cold storage plant. The building will be of stone, four stories and basement, 125 x 225 ft. in width with a capacity of 40,000 barrels.

Julius Kayser & Co., manufacturers of silk gloves, hosiery and underwear, Albany, N. Y., will erect a seven-story factory of concrete construction to cost approximately \$150,000.

The Knox-Reiman Company, Williamsville, N. Y., will build and equip a large planing mill at Main and Walnut streets. The manufacturing business of the Baker Gun & Forging Company, Batavia, N. Y., maker of guns, automobile electric starters, etc., and the Jamesville Mfg. Company, Jamesville, N. Y., maker of automobile parts, is to be merged and the Jamesville plant moved to Batavia, where buildings, equipment and working forces are to be greatly increased. The resignation of Frederick M. Farwell as president of the Baker Company, to take effect March 1, has been accepted by the directors and Hugo Brugman, of Syracuse, president of the Jamesville Mfg. Company, will have general charge of the amalgamated company. D. W. Tomlinson, Jr., superintendent of the Baker Gun & Forging Company, will continue in that capacity in the new company.

The Auburn Converting Company, Auburn, N. Y., is in the market for a 5-hp. motor, 3-phase, 1800 or 2000 revolutions.

The glycerine refinery building of the soap plant of Lantz Bros. & Company, Prince and Lloyd streets, Buffalo, N. Y., was heavily damaged by fire February 14, with a loss of \$75,000 on building and equipment. Replacement will be made at once.

The Interstate Specialty Mfg. Company, Buffalo, has been incorporated with a capital stock of \$25,000 by O. B. Augsberger, G. A. Orr and E. H. Hant to manufacture specialties and novelties in wood and steel. Arrangements for a factory are under way and will be announced later. Temporary offices of the company have been established at 638 Prudential Building.

The plant of the East Buffalo Iron Works at Young avenue and the New York Central Railroad, Buffalo, was damaged by fire February 13 with a loss of \$25,000 on building and equipment. Replacement will be made at once.

The Universal Mfg. & Carbonator Company, Buffalo, has been incorporated with a capital stock of \$1,000,000 and will engage in the manufacture and sale of automobiles and accessories. The directors are Edward J. Liebetrub, William F. Stuhlmiller, William F. Wierling, of Buffalo, and Henry T. Brunsing, of Chicago. The location for a factory has not been fully determined upon.

The Niagara Electric Steel Corporation, Ellicott Square Building, Buffalo, has been incorporated with a capital stock of \$50,000 and has plans for a manufacturing plant under consideration. Leroy A. Lincoln, James N. Mandeville and Karl E. Wilhelm are the directors.

The Harrison Mfg. Company, Lockport, N. Y.,

which recently increased its capital stock to \$200,000, has leased the extensive plant at Elm street and the Erie Railroad, formerly occupied by the American District Steam Company, now located at North Tonawanda, N. Y., and will equip it for the manufacture of auto-radiators under patents of Herbert C. Harrison. O. M. Dill, Lockport, is general manager.

New England

BOSTON, MASS., February 18, 1913.

Some talk is heard that business has fallen off since February 1, but in the machinery trade little tangible proof exists that such is the case. Orders from the New England territory are as numerous and in as great a volume as at any time for some months. Totals for January compared very favorably with those of the same month in 1911 and 1912; with some dealers they were larger. A certain amount of projected business has been deferred, but this is believed to be a temporary condition and probably without special significance. A most convincing argument is that deliveries of machine tools are not improving and in some cases are becoming more distant.

The Mead-Morrison Mfg. Company, Cambridge, Mass., has purchased a tract of land in East Boston and proposes to erect a plant on the premises. The company has had the project in mind for several years, and the recent fire which destroyed a large part of the present works has brought the matter to a head.

At the annual meeting of the Reed-Prentice Company, Worcester, Mass., Vernon F. Prentice and Harry V. Prentice retired from the board of directors, and their places were not filled. The officers are as follows: President, George F. Fuller; vice-president and general manager, Albert E. Newton; vice-president, Lucius J. Knowles; clerk and treasurer, George Crompton; the other directors being Dr. Homer Gage, Frank A. Drury, Harry W. Smith and Charles M. Thayer of Worcester, and George C. Lee of Boston. Mr. Newton is given the vice-presidency in addition to the office of general manager, which he has held since the establishment of the company. The company has taken for manufacturing purposes the large shop building, which it owns, adjacent to the Prentice works, recently occupied by the Morgan Motor Truck Company, now gone out of business. The Prentice shops are overcrowded and the new space, almost duplicating the area of the present building, can be used to most useful purpose. It is not the intention to add to the equipment at present, but spreading out existing machinery will add materially to the efficiency of the plant. The large offices at the front of the building are being put in shape for occupancy as the general offices of the Reed-Prentice Company, and within a month the removal will be made from the Reed offices on Gold street. The report of the treasurer shows that the company has had a very successful year.

Hollis M. Shaw, Augusta, Me., is developing a water power at Hills Mills, and will transmit about 1000 hp. to Rockland, Me., where it is needed for manufacturing purposes. The city will also benefit from the development of a water power in the Kennebec Valley.

The Excelsior Needle Company, Torrington, Conn., will erect an additional factory building, 65 x 120 ft., one story.

G. Haarman & Co., Springfield, Mass., are contemplating an addition to their iron works which will double the present capacity.

Additions to general manufacturing plants of New England include the following: Schmick Handle & Lumber Company, Fairfield, Me., saw mill and handle mill, 100 x 200 ft., two stories, and a thimble mill, 32 x 160 ft.; Stansfield Felting Company, Oxford, Mass., picker and stock building to replace structure destroyed by fire; Tilton Mills, Tilton, N. H., additional building 40 x 80 ft.; Cluett, Peabody & Co., South Norwalk, Conn., factory 80 x 100 ft., four or five stories, and to remodel factory recently purchased, formerly occupied by the Artistic Bronze Company; Taylor, Bramley Knitting Company, Chicopee Falls, Mass., addition 30 x 75 ft., four stories; J. T. Robertson Company, Manchester, Conn., addition 50 x 150 ft., three stories.

The C. M. Shay Fertilizer Works, New London, Conn., were destroyed by fire February 13, with a loss of \$100,000.

At the annual meeting of the Stanley Works, New Britain, Conn., L. Hoyt Pease was re-elected treasurer, but retired as secretary, which office he had held for

25 years, because he desired to be relieved of some of his duties. Harris B. Humason, the assistant secretary, was promoted to the secretaryship.

Philadelphia

PHILADELPHIA, PA., February 18, 1913.

At least one fair sized order for machine tools was placed in the week, covering a considerable number of special tools, with further purchases to be made by the same buyer. General business, however, continues to drag and the bulk of the sales have been confined to small groups and single tools, trading of the latter class predominating. Little new inquiry, involving large lists of tools, is coming out, although there is a very fair small lot and single tool inquiry, covering the general line of equipment. Railroad business is still being held back, except in instances where an occasional tool is required for practically immediate shipment. Manufacturers of tools report a fair run of new orders, mostly in small lots, but sufficient to maintain an even rate of production. In special tools and machinery a good demand is noted. The second-hand machine tool market continues irregular. Further inquiries for power equipment, both new and second-hand, are developing, principally for small and moderate capacity. The foundry trade continues active, particularly in connection with special castings in both iron and steel. The export demand for machine tools remains quiet.

The Diamond Knitting Mills has had plans prepared by W. E. S. Geyer, architect and engineer, Land Title Building, for a manufacturing building to be erected at Seventh and Green streets. Plans include the installation of a power plant and elevators, information regarding which may be had from the engineer.

Local contractors are figuring on the erection of a substation at Lancaster, Pa., for the Edison Electric Company, of that city. Plans call for a one-story building, 70 x 153 ft., of hollow tile and concrete construction.

The Pennsylvania Railroad Company is asking for bids on the construction of a one-story passenger station and sheds to be erected at Chambersburg, Pa., from plans by W. H. Cookman. The company has reserved the heating, lighting and elevators from the general bids.

Robinson & Crawford will build a five-story concrete warehouse on Pennsylvania avenue above Nineteenth street. The building will be used in connection with warehouse purposes for a chain of retail grocery stores operated in this city. An extensive elevator equipment is included in the plans.

Proposals will be received until February 26 by the Board of Awards, City of Baltimore, Md., for furnishing, under contract No. 10, for the new Loch Raven dam two 48-in. gate valves and necessary appurtenances. Specifications may be obtained from Ezra B. Whitman, water engineer, Baltimore, Md.

The Dorance-Reinecke Company, Philadelphia, has been incorporated under the laws of New Jersey, with a capital stock of \$20,000, to manufacture, sell and deal in mechanical devices of all kinds. The incorporators named are nominal, including F. R. Hansell, Philadelphia; George H. B. Martin and C. S. Seymour, Camden, N. J.

The Edwards & Smith Company, recently located at Fifteenth street and Washington avenue, Philadelphia, operating a brass, bronze and aluminum casting plant, has removed to Easton, Pa., where it has taken the plant formerly occupied by the Easton Glass Company, which has been altered to suit its purposes. The new plant is now operating in a limited way and will in a short time double the company's former capacity.

Blumenthal Bros., cocoa manufacturers, have let a contract for the construction of a factory building 83 x 305 ft., three stories, and a boiler house 50 x 75 ft., to be erected at Margaret and James streets, Frankford. Power plant and elevators are to be installed, details regarding which are not yet available.

The Wills-Jones-McEwen Company is having plans prepared for a three-story, reinforced concrete building, 98 x 156 ft., to be erected at Twenty-sixth and Jefferson streets. A steam-heating plant and elevators are to be installed. Detailed plans have not yet been completed.

It is announced that the National Enameling & Stamping Company, Baltimore, Md., has had plans prepared and are taking bids on a proposed brick and steel addition at Light and Race streets, that city, which will be used for general manufacturing purposes.

Cincinnati

CINCINNATI, OHIO, February 18, 1913.

While the general trend of business is in the right direction, considerable irregularity is encountered in reports from the machine tool trade. However, the fact that they are all working on full time, with several having extra shifts employed, is an indication that matters are in fairly good shape. One of the most assuring elements in the local situation is the activity of the jobbing foundries, who make a specialty of machine tool castings.

The export business with woodworking machinery manufacturers is excellent, and there is a good domestic demand for electrical equipment. Gas engine makers in this territory have about all they can handle.

The Ohio Brass & Copper Company, Cincinnati, will soon move its plant from 424 Elm street to a building at 412 Elm street. It will add sufficient equipment to double its present output.

The Interstate Folding Box Company, Middletown, Ohio, has been incorporated, with \$10,000 capital stock, by Samuel Bergstein and others. Very little machinery equipment will be required.

The Cincinnati Mfg. Company, maker of special ornamental iron goods and wire screens, intends moving its plant to a larger site secured at Gest and Evans streets. It will also add some additional machinery later on.

Extensive coal mining operations will be carried on by the Elkhorn Fuel Company, recently incorporated with \$30,000,000 capital stock. J. A. Clark, Fairmont, W. Va., is president of the new company.

An ice plant will be erected at Coshocton, Ohio, by the newly incorporated People's Ice Company. John Lorenz is one of the principal incorporators.

Power plant equipment will be required for a 12-story office building to be erected at Sixth and Main streets, Cincinnati. Ernest Flagg, a New York architect, is now preparing the plans.

The Brunswick-Balke-Collender Company, Cincinnati, is having plans prepared for a one-story brick factory and warehouse, to be erected this spring. Only a small amount of woodworking and power equipment will be required.

The Frank B. Ball Electric Company, Mt. Vernon, Ohio, will soon be in the market for a small electric lighting plant to be erected at Fredericktown, Ohio. No details are yet available.

The South Webster Brick Company, Portsmouth, Ohio, will soon double the capacity of its plant, and will install considerable additional machinery.

The H. C. Wood Ice Company, Cincinnati, has plans under way for a large ice plant to be erected at Columbus, Ohio.

The Piqua Hosiery Company, Piqua, Ohio, will make a large addition to its plant, for which special machinery will be required.

The Cincinnati Pulley Machinery Company, Covington, Ky., whose plant was recently destroyed by fire, has leased a building at Fourth street and Madison avenue, which it will occupy as soon as the necessary equipment can be secured.

The Federal Carbon Company, Loveland, Ohio, has been organized with \$1,000,000 capital stock, to manufacture special carbon products. Clay B. Steele may be addressed for information regarding machinery requirements.

The Elkins Box Company, Elkins, W. Va., will erect a large addition to its plant that will be used for the manufacture of bolts.

The Indestructible Sign Company, Columbus, Ohio, recently organized, will soon be in the market for special metal working machinery. C. A. Devine is president of the company.

The Kennett Motor Truck Company, Cincinnati, is having plans prepared for a two-story garage.

The Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, has increased its capital stock from \$160,000 to \$260,000. Information is not available as to whether any additions are planned.

The John B. Morris Foundry & Machine Company, Cincinnati, has acquired additional property adjoining its plant that will be used for yard storage purposes, and not for a building addition, as has been currently reported.

At a recent meeting of the Ironton Engine Company, Ironton, Ohio, the directors elected the following officers: President, H. A. Marting; vice-president, F. C. Tomlinson, and treasurer and general manager, E. B. Hetzel.

The Cellular Steel Company, Cincinnati, is a new

incorporation with \$100,000 capital stock, organized to take over the plant and business of the Cellular Metal Company, in Carthage suburb. E. W. Edwards, president Edwards Mfg. Company, is president of the new company, and G. Myers, secretary. About \$50,000 worth of new machinery will be installed in the plant, most of which is already being negotiated for. The company will manufacture fireproofing material.

Cleveland

CLEVELAND, OHIO, February 18, 1913.

Business with machinery houses was good in the week, and a very satisfactory volume of orders is in prospect. A Cleveland dealer took an order for 25 machines, largely lathes and drill presses, from a Dayton, Ohio, maker of automobile parts. Other sales were mostly in single tools. The Marion Steam Shovel Company, Marion, Ohio, has followed its preliminary list with an inquiry for quite a number of additional machines. It is understood that this company will buy close to \$100,000 of machine tool equipment, for which lists will be sent out piecemeal during the next few weeks. This machinery will be used to equip a large plant addition now under construction. It is understood that an order for five cranes for this plant has been placed with the Morgan Engineering Company, Alliance, Ohio. Considerable machinery equipment has been purchased in the past two weeks by the General Electric Company for its Erie, Pa., plant. There is a good and widely scattered demand for turret lathes and an active foreign demand for this class of machinery, particularly from England and Germany. Orders for cranes and hoists continue to come out in good volume. Local manufacturing plants in the metal trades are generally running at full capacity and there is a scarcity of good machinists.

The Diebold Products Company, Cleveland, has been incorporated with a capital stock of \$25,000 by Charles R. Diebold and others. Mr. Diebold has retired from the Diebold-Peters Company, maker of automobile parts, to devote his attention to the new company, which will establish a plant on St. Clair avenue, near Fifty-fifth street, for the manufacture of automobile parts. The Diebold Company is now in the market for three lathes, shaper, upright drill, sensitive drill, and will probably purchase some other machine tool equipment.

A new plant for the manufacture of light stampings has been established at 1831-1833 East Fifty-fifth street, Cleveland, by the Diamond Stamping Works Company, which has just been incorporated with a capital stock of \$35,000. H. Koren is president of the company, and C. W. De Mooy is secretary and treasurer. The company will do general jobbing work in stampings.

The Metal Shop Mfg. Company, Cleveland, Ohio, has been incorporated with a capital stock of \$10,000 to make various sheet metal products. Among the incorporators are E. Grant Criswell, William T. Teagler and George T. Bauder.

The plant of the Christy Steel Company, Akron, Ohio, was burned February 11, the loss being estimated at \$25,000.

The Standard Shock Absorber Company, Cleveland, Ohio, has been incorporated with a capital stock of \$100,000 to manufacture and deal in shock absorbers and various automobile accessories. The incorporators are C. D. Sward, William Leary, S. A. McGill and others.

The City Council of Findlay, Ohio, has instructed the light committee to employ an engineer to furnish estimates for a new municipal lighting plant.

The plant of the Findlay Motor Works, Findlay, Ohio, which was bought at a receiver's sale by J. S. Cleary of Milwaukee, has been transferred to W. W. Edwards, Leipsic, Ohio. There is a possibility that the operation of the plant will be resumed.

The National Sanitary Mfg. Company, Salem, Ohio, maker of porcelain enameled iron sanitary ware, is planning the extension to its plant and the erection of a new power house. The stockholders will vote on bond issue of \$125,000 to provide funds for extensions.

The Interstate Heater Company, Cleveland, Ohio, has been incorporated with a capital stock of \$150,000 by Edward Young, Hubert O. Evans, H. H. Gray, F. G. Castle and S. E. Sackerman.

It is announced that the Toledo Steel Barrel Company, Toledo, Ohio, will enlarge its plant and provide about three times its present capacity.

Indianapolis

INDIANAPOLIS, IND., February 18, 1913.

The Granite Brick Company, Michigan City, has been incorporated with \$75,000 capital stock, to manufacture brick. The directors are A. C. Heitschmidt, L. Holutz and A. J. Schmid.

The Peru Tire & Rubber Company, Peru, Ind., has been incorporated with \$25,000 capital stock, to manufacture tires. The directors are C. E. Miller, O. J. Tillet and L. Miller.

The Indiana Rubber & Insulated Wire Company, Jonesboro, Ind., has increased its capital stock \$300,000.

The LaPorte Gas & Electric Company, LaPorte, Ind., has been incorporated with \$1,000,000 capital stock, to furnish water, light, heat and power. The directors are W. A. Martin, C. M. Hurd and B. C. Robinson.

The Pierce Speed Controller Company, Anderson, Ind., has been incorporated with \$25,000 capital stock, to manufacture speed indicating and controlling devices. The directors are George W. Pierce, F. E. Mustard and N. M. McCullough.

Szabo & Co., South Bend, Ind., have been incorporated with \$5,000 capital stock, to do a general construction business. The directors are B. Szabo, E. Bary and S. F. Pakay.

The Indiana Builders Supply Company, Evansville, Ind., has been incorporated with \$10,000 capital stock, to deal in building material and supplies. The directors are G. P. Beeler, E. C. Kerth and R. E. Sampson.

The Lawter Tractor Company, Newcastle, Ind., has been incorporated with \$10,000 capital stock, to manufacture farm machinery. The directors are B. H. Lawter, O. P. Carpenter and J. C. Goodwin.

The Terre Haute Stone Works, Terre Haute, Ind., has been incorporated with \$15,000 capital stock, to quarry stone. The directors are E. D. Chadwick, G. T. Stevens and S. Cleland.

Chicago

CHICAGO, ILL., February 18, 1913.

The outlook for machinery sales in the spring is exceedingly encouraging. A large number of well established manufacturing concerns have plans under way for plant extensions as soon as building operations may be safely started and additional machinery equipment will be purchased to provide for increased business demands. At Beloit, Wis., a striking example of such expansion is noted in the proposed additions to the plants of the Gardner Machine Company, Berlin Machine Works, C. H. Besly & Co., Fairbanks, Morse & Co. and Warner-Stewart Speedometer Corporation. It is reported that the Wabash Railroad is about ready to distribute orders for the equipment included in its recent list. The Chicago & Northwestern Railway, which is in the market for several tools, as noted recently, is spending \$350,000 for new terminal facilities, including a roundhouse and machine shop at Green Bay, Wis. The Pere Marquette Railroad is asking for quotations on a car wheel boring machine, one 16-in. heavy duty back-geared shaper, one 30 x 96-in. grinder, one bench grinder and one 8-in. guide bar grinder. In the local market dealers are still feeling the impetus of buying which developed as an incidental to the automobile shows. While there was some buying by automobile manufacturers, the feature buying was done by garage owners, whose purchases were largely from stock tools on the floor. One dealer reports sales of about 20 machines for immediate delivery. The Gardner Machine Company was a recent purchaser of a Rochester horizontal boring machine, a Warner & Swasey turret lathe and an engine lathe.

Joseph J. Dobes and Benjamin Jelinck are having plans prepared in the office of H. Webster Tomlinson, 64 East Van Buren street, Chicago, for a one-story machine shop to be 73 x 116 ft. and to cost \$12,000.

The International Automobile Supply Company, Chicago, has been incorporated with a capital stock of \$5,000 to manufacture automobile supplies. The incorporators are William L. Loeffel, 6813 Lakewood avenue; Mark T. Adams and William E. Stephens.

The Cribben & Sexton Company, Chicago, manufacturer of stoves, has let contracts for the erection of a building to be 100 x 150 ft., five stories, of brick and reinforced concrete.

The Advance Mfg. & Novelty Company, Chicago, has been incorporated with a capital stock of \$10,000 by William D. Martin, J. J. Kratz, 7014 South Green street, and C. W. Jones.

The Standard Cap & Seal Company has leased

manufacturing space at Wells street and the Chicago River, Chicago, which it will occupy April 1.

The Western Pump & Engineering Company, Chicago, has been incorporated with a capital stock of \$3,000 to manufacture power plant equipment by J. E. Bond, R. C. Wise, 1918 Lunt avenue, and C. B. Moore.

The Factory Products Company, Chicago, has been organized with a capital stock of \$10,000 to do a general manufacturing business. The incorporators are H. Franklin Peterson, Harold T. Peterson and Hubert E. Page, 140 South Dearborn street.

The Spengler Bros. Company, Rockford, Ill., machinery manufacturer, has increased its capital stock from \$20,000 to \$120,000.

The Tri-City Railway Company has decided upon a site in Rock Island, Ill., for its new car shops, which will be 225 x 250 ft., and will cost \$300,000.

The Enterprise Machine Company, Minneapolis, Minn., has plans under contemplation providing for the erection of a new shop.

The R. C. Kuhn Sash & Door Company, Minneapolis, Minn., has decided to move its offices and factory to La Crosse, Wis.

The Herzog Iron Works, St. Paul, Minn., whose plant was practically destroyed by fire recently, with a loss of about \$35,000, is planning to locate in Minneapolis, where a large factory will be built.

Detroit

DETROIT, MICH., February 18, 1913.

While the machinery market is in a satisfactory condition and an average volume of business was transacted the past week, no sales of unusual importance were reported. The bulk of the trade was in single tools, the large number of floor sales being the feature. Inquiries are coming in in good volume, indicating that there will be no further slackening in activity. In common with other parts of the country, the open winter has caused a demand for ice making machinery in Detroit. Reports received from makers of elevators evidence a large number of installations, with the outlook good for continued activity. The demand for woodworking machinery is rather slack, as is that for most lines of electrical equipment. Second-hand machinery, in first-class condition, is moving freely. Makers of gasoline engines are crowded with orders. Conditions in the foundry trade are unchanged. The amount of new work reported in the building trade was negligible.

The Read Motor Car Company, Detroit, which was incorporated recently with \$1,000 capital stock to manufacture automobiles and auto parts, has increased its capital stock to \$50,000, preparatory to beginning actual manufacturing operations. The principal stockholders are Ray J. Mead and Joseph E. Beatty.

The Goodspeed Detroit Mfg. Company, Detroit, has been incorporated with a capital stock of \$20,000 to manufacture automobile parts and accessories. The principal stockholder is George H. Laying.

The Chandler Motor Car Company, Detroit, has been organized by F. C. Chandler, Charles A. Emise, J. V. Whitbeck and others to manufacture automobiles. The company has opened a temporary office at 928 Woodward avenue.

The Detroit Carburetor Company, Detroit, has increased its capital stock from \$25,000 to \$50,000.

The Detroit Twist Drill Company, Detroit, has filed notice of an increase of capital stock from \$150,000 to \$300,000.

The Commerce Motor Car Company, Detroit, has increased its capital stock from \$50,000 to \$100,000.

The plant of the Ypsilanti Reed Furniture Company, Ionia, Mich., was destroyed by fire February 14, entailing a loss of \$250,000. Immediate steps will be taken by the company to resume operations, including the purchasing of new machinery.

The Saginaw Wood Products Company, Saginaw, Mich., manufacturer of wooden specialties, is completing an addition to its plant, 48 x 100 ft., and will also erect a new one-story power plant 50 x 100 ft. E. S. Weissberg is manager.

Schneider & Brown, Marquette, Mich., lumber manufacturers, have completed plans for the erection of a planing mill having a capacity of 50,000 ft. per day. Modern motor driven machinery will be installed.

The Admiral Auto Company, St. Louis, Mich., has been formed, with an authorized capital stock of \$50,000 by Earl Porter, H. G. Dewey and others, of Alma, Mich. The new company will establish a plant at St. Louis for the manufacture of automobile trucks and gasoline tractors.

The Northwestern Leather Company, Sault Ste. Marie, Mich., has increased its capital stock from \$1,000,000 to \$1,500,000.

The city of Pontiac, Mich., has awarded the general contract for the erection of a new high school building to W. H. Isgrigg & Sons, Greensburg, Ind. Extensive manual training shops will be equipped.

The Cheboygan Paper Company, Cheboygan, Mich., is considering the installation of additional equipment, including two dryers and a double beater.

The buggy and automobile factory of the Lee & Porter Mfg. Company, Buchanan, Mich., was damaged by fire February 11, entailing a loss estimated at \$75,000.

Milwaukee

MILWAUKEE, WIS., February 17, 1913.

Possibly the best indication of the present situation in the machinery industry in the Milwaukee district is the fact that pay-rolls are increasing numerically at a rapid rate. The report made by W. J. Fairbairn, secretary of the Milwaukee Metal Trades & Founders' Association and manager of its bureau, 32 Hathaway Building, to the Industrial Commission of Wisconsin in regard to labor conditions in January shows a very appreciable increase in the number of men employed as compared with December. Thus far in February the same condition continues, with perhaps more acceleration. Machine tool builders are booking a large number of orders in small lots. Power, mining and milling machinery trade is very satisfactory. Export business is showing steady gains.

The Allis-Chalmers Company, Milwaukee, has just been granted a big repeat order for flour milling machinery by the Maple Leaf Milling Company, at Port Colborne, Ont., which is doubling the capacity of its plant, now 9,000 barrels per day.

The Milwaukee Hardware Mfg. Company, 325 Germania Building, Milwaukee, is contemplating a considerable increase of its productive capacity, having purchased several inventions. The company is in the market for a large press and some other equipment not yet scheduled. About \$30,000 will be invested in railroad devices at once.

The Harley-Davidson Motor Company, Milwaukee, has leased the Pawling shop building at Clinton and Reed streets, as temporary quarters for its automatic screw machine department because of the overcrowding of its present floor space. Although the company has increased its floor space by 143,300 sq. ft. since September 1, 1912, it is badly crowded and a third structure will be erected in the spring. The Pawling building, formerly used as the Milwaukee School of Trades for Boys, 91x100 ft., is two stories.

The Lewis Motor & Engineering Company is being organized by Ralph C. Lewis, who recently resigned as general manager and designer for the Beaver Mfg. Company, automobile motors, and proposes to establish a workshop for the production of gasoline motors for pleasure and commercial cars. Details are not ready for publication.

Joseph W. Moore has purchased the interest of James B. McCue in the West Allis Machine Company, West Allis, Wis., a co-partnership conducting a general machine shop business.

The Frost Engine Company, Evansville, Wis., manufacturer of stationary and portable gasoline engines, is planning a considerable expansion of its production and while no new buildings are contemplated at once, some additional tools will be required. The officers were re-elected at the annual meeting and H. A. Langemack added to the directorate. George L. Pullen is president.

The Shoe Dealers' Machine Company, Berlin, Wis., has been incorporated under the laws of Wisconsin with a capital stock of \$30,000 to establish a plant for the manufacture of machines and tools for shoemakers and repairmen. F. M. Huson, W. H. Wyman, B. E. Scott and T. W. Hamilton are the incorporators.

The Salem Electric Company has been organized with a capital stock of \$4,000, which proposes to establish an electric lighting and power service at Salem, Kenosha, County, Wis. The promoter is William Peterson.

The Cleveland Light & Power Company has been incorporated with \$5,000 capital stock to build an electric plant at Cleveland, Manitowoc County, Wis. August Erdman, Charles F. Wimpler and Charles Lorfild are the incorporators.

The Davies Threshing Machine Company, Osh-

kosh, Wis., is obtaining estimates covering the erection of a large addition to its plant.

The Holbrook-Armstrong Iron Company, Racine, Wis., has ordered a 20-ton Whiting cupola and a 5½ ft. root blower for the addition now being erected to its foundry. The addition is 60x80 ft., of brick and steel construction.

The Stewart-Warner Speedometer Corporation, in a communication, announces the proposed enlargement of its Beloit, Wis., plant by the extension of some of the wings of the present building.

The Racine Stool Mfg. Company, Racine, Wis., has prepared plans for doubling the capacity of its plant at an estimated cost of \$10,000.

The National Gauge & Register Company, La Crosse, Wis., is in the market for automatic screw machines and a 250-hp. steam generating plant with dynamo. Preference will be given to a used plant in good condition.

The Central South

LOUISVILLE, KY., February 18, 1913.

While a good many inquiries are in the market, few sales of consequence have been reported. However, there is no disposition to complain of the situation, but on the other hand the general expression is that business is up to expectations. The activity of practically all manufacturing plants in this territory gives good ground for the expectation that business will continue good, this being indicated in the heavy sales of mill supplies by houses handling those lines in connection with machinery. The call for used equipment is noticeably strong just at present.

The American Creosoting Company, Louisville, is arranging to build two new plants for the treatment of railroad ties and other timbers. One of the plants is to be in Canada and the other at Indianapolis. The company has inquiries out for the pumps, which are fifteen in number. They include vacuum, oil and boiler-feed pumps, steam-driven and motor-driven centrifugal pumps. Most of the bids are in for this lot. A little later the company will buy retorts, storage tanks and structural steel for use in the construction of the plants. Address the purchasing agent.

The Falls City Construction Company is now receiving bids on the power equipment for the tire factory of the Speedway Tire Company, to be located here. A Corliss engine, generator and a large number of motors will be bought. Used equipment is desired. H. L. Lewman is president of both companies.

The machinery exhibit held last week in connection with the annual convention of the National Cannery Association in Louisville was pronounced to be one of the largest and most representative ever held. The machinery men have a separate association, which met and elected officers.

The Lewisburg Foundry Company, Lewisburg, Tenn., has been organized with \$50,000 capital stock and has elected S. T. Hardison president, W. T. Archer vice-president and Knox Walker secretary and treasurer. The plant of the Sheffield Foundry Company, Sheffield, Ala., is to be moved to Lewisburg. It will be enlarged and improved with the installation of additional equipment. W. T. Archer was general manager of the Sheffield concern, and will be in charge of the business in Lewisburg.

William M. and J. R. Jones, of Barbourville, Ky., are arranging to open a large coal mine near Hazard, Ky. They intend to install a plant for the generation of electric current, and will apply to the town of Hazard for an electric light franchise.

The Evans Chemical Company, Nicholasville, Ky., has leased from owners in Fayette County, near Lexington, Ky., a 50-acre tract which will be mined for barytes and other ores. The company will install a mining plant in the near future.

John Deboor has been elected president of the Henry Clay Distilling Company, Lexington, Ky., which was recently organized. The concern has taken over an old plant, which has been dismantled. Contracts for new machinery will be let in the immediate future.

The city of Paducah, Ky., will open bids April 1 on the erection of a garbage incinerator with a capacity of 50 tons a day. The city is also in the market for a pump to be installed in a large sewer. T. N. Hazelp, is mayor.

The Bluegrass Dairy & Ice Company, Lancaster, Ky., is in the market for a direct-connected engine and dynamo of 10 kw. capacity.

Dunbar Bros., Spartansburg, S. C., are erecting a large factory for the production of farm wagons. Power and wood-working equipment will be needed.

The Wright Motor Car Company, Memphis, Tenn., has been organized and has established quarters at Fourth street and Monroe avenue. A service station will be located and equipped with machine tools for repair work.

W. T. Halliday, Chicago, and M. Zimmerman, Ottawawa, Mich., are considering the establishment of a factory for the manufacture of paper boxes at Chattanooga, Tenn.

W. P. Biddle, Knoxville, Tenn., plans the establishment of a plant to manufacture steel ranges. Punches, shears, brake tumblers and other equipment will be needed.

The Beare Bros. Ice & Coal Company, Jackson, Tenn., is in the market for a small motor and a deep-well pump. Used machinery will be considered.

The Cadillac Sales Company, Knoxville, Tenn., has been organized by T. T. Pace, E. C. Mahan and others. The concern will establish a garage and repair shop, the equipment of which will involve the purchase of a number of machine tools.

The Stonega Coke & Coal Company, Stonega, Va., is planning the expenditure of \$200,000 in Wise County, Va., including the enlargement of the power plants at the various mines. A. H. Reeder is manager of the company.

The Francois Coal & Coke Company, Clarksburg, W. Va., has been organized with \$10,000 capital stock and will develop mining property in that section. Electrical equipment will be purchased. J. M. Francois is president of the company.

The West Virginia Traction & Electric Company, Wheeling, W. Va., plans the enlargement of its system, including probably the installation of additional power equipment. Detailed plans have not yet been announced.

St. Louis

St. Louis, Mo., February 17, 1913.

The conditions in the machine tool market have shown a decided improvement in the past ten days, in respect of the development of new business and dealers are very much encouraged over the outlook. In addition the Wabash receivers are actively at work upon the selection of the best bidders on the long list of tools required for the new Decatur shops, with prospects that the awards will be made shortly. The improvement noted is general and the prospects for early spring business are now regarded as excellent. So far, it is reported, February has practically equalled the total of the January business.

The St. Louis Cordage Mills, a branch of the American Mfg. Company, has taken out a permit for a \$50,000 addition to the plant. The amount of new equipment required is not announced.

The Fred Medart Mfg. Company, St. Louis, will build a 40-ft. addition to the factory building now occupied by the company for the manufacture of metal lockers and gymnasium supplies.

The Imperial Film Mfg. Company, with \$30,000 capital stock, has been incorporated in St. Louis to equip a plant for the manufacture of moving picture films. The incorporators are Otto E. and George T. Goebel, G. P. Hamilton and August Froebel.

The W. W. Wilson and Wrope Stave Company, with \$50,000 capital, has been incorporated at Little Rock, Ark., by W. W. Wilson, W. R. Wrope and W. W. Roberts. A plant is to be equipped shortly.

The Otis Elevator Company, of Missouri, Security Building, St. Louis, has bought a site for the construction and equipment of a factory building in conjunction with its business. The complete plans are not ready for announcement.

The Missouri Paint & Varnish Company, of St. Louis, has bought the plant of the Wellpot Varnish Works in St. Louis, and will re-equip and operate it as a branch.

The St. Louis Chalk & Clay Company, with a nominal capital stock, has been incorporated by James Walsh, A. C. Fitze, Julius Koenig and others to mine, manufacture and otherwise handle chalk, clay and other minerals. Plant plans have not been announced.

The Electrical Construction & Maintenance Company has been awarded the contract for the lighting of the city of Webster Groves, Mo., and will proceed to equip for the purpose. A. C. Einstein, of the Union Electric Light & Power Company, of St. Louis, is interested in the new company.

The machinery and engine building of the Columbia Quarry Company, of Columbia, Ill., burned the past week with a loss of \$35,000. Charles H. Krause,

of St. Louis, is president. Replacement plans have not been announced.

The Middagh-Collins Covering Company, of St. Louis, has leased new quarters for the purpose of increasing the capacity of the plant. It manufactures boiler and steam pipe covering, etc.

The Century Electric Company, of St. Louis, has begun work on an eight-story factory building in St. Louis, which it will occupy in addition to its present plant. The new building will cost \$100,000 exclusive of mechanical equipment.

The packing plant of Albert Schnurr, St. Louis, was damaged \$10,000 by fire last week. The replacement plans have not been announced.

The L. T. Tucker Company, Frankford, Mo., will install a plant for the generation of electric light for public use, having been granted a franchise by the city.

The Kansas City Terminal Company, Kansas City, Mo., announces plans for the construction and equipment of a lighting and heating plant and has appropriated \$617,000 for the purpose.

The city of Hinton, Okla., has decided to equip an electric light plant to cost about \$10,000 and has engaged W. L. Benham, of Oklahoma City, Okla., to supervise the work.

An electric light plant to cost about \$6,000 is to be built at Texhoma, Okla., under the direction of W. M. Magruder, of Liberal, Kans., engineer.

The Curtis & Co. Mfg. Company, St. Louis, with its plant at Wellston, Mo., has plans for the enlargement of its machine shop and foundry and the addition of considerable equipment.

The Kanokla Oil Company, recently noted as incorporated at Muskogee, Okla., is in the market for drilling equipment. John H. Mosier and others are interested.

The Waters-Pierce Oil Company, St. Louis, has bought a site at Yale, Okla., and will proceed at once with the construction of a large refinery.

The Siloam Springs Ice & Water Company, of Siloam Springs, Ark., has been incorporated with \$10,000 capital stock by J. O. Patterson, J. R. Meyers and Will D. Sweet to equip an ice manufacturing plant.

The Union Ice & Cold Storage Company, with \$30,000 capital stock, will remodel the plant at St. Joseph, Mo., formerly operated by the St. Joseph Packing & Transportation Company. The ice plant will have 25 tons daily capacity. The incorporators are J. W. DeVorss, O. A. Keys and others.

A sawmill and slack barrel stave plant is to be constructed at Harrisburg, Ark., by Gatlett & Foley.

The D. J. Lander Lumber Company, Springfield, Mo., has increased its capital stock from \$50,000 to \$300,000 for the purpose of extending its milling and other operations.

The Minor Heir Producing Company, Joplin, Mo., with \$20,000 capital stock, has been incorporated by Edward A. Sheridan, Samuel M. Adams, James F. Gallagher and E. A. Hamilton and will equip for mining land controlled by them.

The D. & Y. Mine at Joplin, of which W. H. Yankie is manager, is rebuilding its concentrating plant to 100 tons daily capacity and will install a 65 hp. engine.

The Producers' Pipe Line Company has plans for the construction at Delaware, Okla., of a plant to manufacture gasoline from waste natural gas and will install 10 high power compressors, each operated by a 50 hp. engine.

The city of Charleston, Mo., has plans for the extension of its waterworks plant at a cost of about \$85,000. Some sewer work is included.

A waterworks plant to cost about \$30,000 is to be built in the city of Marksville, La., under the supervision of Rees & Wagner, engineers, Shreveport, La.

Bids will be received to March 4 for the construction of a waterworks plant for the town of Tutwiler, Miss. The engineers are R. C. Huston & Co., Memphis, Tenn.

The shingle mill and cotton gin of Owen & Sons, at Kokomo, Miss., were burned last week. It is stated that they will be rebuilt.

The Collier-Adams Mfg. Company, St. Joseph, Mo., has been organized with a capital stock of \$100,000 to take over the sash and door department of the American Sash & Door Company. J. T. Carr and J. T. Adams, of Dubuque, Iowa, are the largest stockholders.

The Ell-Kay Mfg. Company, Kansas City, Mo., is making improvements to its plant and is in the market for the following power machinery: One angle iron rolls, one power punch and riveter, one 120-in. shearing machine to cut 5-16-in. iron, and one cut-off saw for I-beams.

Texas

AUSTIN, TEXAS, February 15, 1913.

The machinery trade in the last week or ten days has been dull, due chiefly to the continuous rains which precluded outside work. The heavy precipitation, however, is expected to prove of great benefit as it practically assures an abundant yield of the earlier crops. Corn planting and some cotton planting are going on in southern Texas. The cotton planting season, however, will not begin for several weeks over most of the State. The interurban railway development which has been particularly active in the territory around Dallas in the last few years is spreading to other parts of Texas and a large number of projects of this character are now being promoted.

It is announced by L. L. Stevens, of Big Springs, who recently purchased the electric light and power plant at Yoakum from the Yoakum Improvement Company, that he will spend \$30,000 in enlarging and improving the property.

The Angleton Gin & Power Company will install an electric light plant at Angleton. It will also establish an ice factory.

John Watson will rebuild his broom factory at Keene, Texas, which was recently destroyed by fire.

Preparations are being made by the City Commission of Dallas to issue \$550,000 of sanitary sewage disposal bonds, the proceeds of which will be used to construct a modern sewage disposal plant. J. H. Fuertes, hydraulic engineer, is now preparing the plans for this improvement.

W. H. Bowles is preparing to bore wells in the section around Gonzales in search of oil and gas.

Preparations are being made by the Tenn-Tex Oil, Gas & Development Company to bore test wells in the locality around Campbellton in search of oil.

The Badger Oil Company, Wichita Falls, has been organized with a capital stock of \$50,000 for the purpose of operating in the oil fields around Wichita Falls. The incorporators are George L. Woodward, Charles C. Huff and Orville Bullington.

The Embury Farm Oil Company, which has a capital stock of \$50,000, will bore oil wells in the section around Wichita Falls. The incorporators are J. G. Hardin, J. I. Staley, J. J. Perkins and others.

The Wyatt Metal Works will establish a metal works plant at Dallas. W. J. Wyatt and others are interested.

The Saragosa Gold Mining Company, Saragosa, which has recently been organized, will install machinery and develop a gold ore claim situated near there. H. Robbins is president.

The Heck Machinery Company, Austin, has been organized with a capital stock of \$50,000. The incorporators are M. F. Heck, I. C. Heck and H. L. Dempster.

The De Leon-Gorman Light & Power Company will build electric light and power plants at De Leon and Gorman. The incorporators are W. L. Lowe, J. T. Collie and W. M. Collie.

The Bowden Carriage Company, Texarkana, has been organized. The incorporators are W. A. Gibbons, Andrew Bowden and W. G. Patterson.

The City Council of Paris, Texas, has let the contracts to Smith & Whitney and the Briggs-Weaver Company of Dallas for three pumps and four motors that are to be installed at the municipal electric pumping plant.

Local citizens of Moulton have organized a company for the purpose of building an electric light and waterworks plant.

F. W. Johnson and associates will establish a cold storage plant at Pecos.

The Edwards-Henry Company is negotiating for the purchase of a site for its proposed cotton ginning plant and reinforced concrete cotton sheds, which are to be erected at a cost of \$100,000. T. A. Edwards of Dallas is president and J. R. Henry is vice president and general manager.

The Texas Bag & Fiber Company, Houston, has let the contract to the James Black Masonry & Constructing Company for the erection of a factory building at Houston to cost \$50,000. The structure will be three stories and basement.

The contract for a new electric light power plant at Hearne has been awarded to Randall, Lovegrow & Wyman, of Houston.

An election of taxpayers held on February 7 to vote on the proposition of issuing \$25,000 bonds for sewers, \$100,000 for street improvements and \$120,000 for school buildings, at Waco, resulted favorably for all three amounts.

The Pacific Coast

PORTLAND, ORE., February 11, 1913.

The machine tool business in this district usually does not open up in a large way until April, but for this time of year the market is comparatively active. No single orders of notable importance have come out, but the volume of scattering orders indicates favorable conditions throughout the north coast district. Operations in the lumber industry are gradually increasing, and numerous prospective transactions in logging and woodworking equipment are being closed. The outfitting of Alaska salmon ships has commenced, and the fishing industry on Puget Sound is giving rise to considerable business, as cannerymen there expect a heavy run in the coming summer. Small marine gas engines are in strong demand, and boat-building shops are busy. Plans are rapidly taking shape for development work in the interior, and considerable railroad work is in prospect. Numerous improvements are being made by machinery merchants, who expect to handle an unusually large business in the summer.

The Pacific Machinery & Tool Company, Portland, has been incorporated with a capital stock of \$6,000 by E. D. and O. J. Ulrich, Fred and C. M. Hyskell.

The American Wood Pipe Company, Tacoma, Wash., recently organized, has secured a factory site and expects to install a plant shortly.

The Northwest Harvester Company is building an addition to its plant at Spokane, Wash.

It is reported that the Swayne & Hoyt Lumber Company, which has recently acquired mill property on Coos Bay, Ore., will put in considerable new machinery.

The Anacortes Glass Company, Anacortes, Wash., is planning to double the capacity of its plant.

W. A. Nelson is negotiating for the purchase of a machine shop at Colfax, Wash.

The Washington Saw Works, Seattle, Wash., has purchased the plant of the J. E. Fox Saw Company, which is being enlarged and will be occupied in the spring.

The Inman-Poulsen Logging Company, Kelso, Wash., has purchased a Bucyrus combination steam shovel and crane for railroad construction.

The Mountain Timber Company, Kalama, Wash., is increasing its boiler capacity and machinery.

The Willapa Lumber Company, Willapa, Wash., is installing a 3-band gang saw and making numerous other improvements in its mill.

The Spalding Construction Company, Portland, will soon start work on a \$100,000 contract for the construction of a large machinery warehouse for the Honolulu Iron Works at Honolulu, T. H. The building will be four stories, of reinforced concrete, containing 96,000 sq. ft. of floor space, and will include a fine display room.

The Richmond Wind & Power Company, Richmond, Cal., is preparing to install a lot of new machinery.

Birmingham

BIRMINGHAM, ALA., February 17, 1913.

Owing to the continuous organization of new ore, coal mining and quarrying companies which are exploiting new fields in Alabama, extraordinary structural activity of commercial and industrial character, railroad extension and double track work and water power development as well as briskness in the saw-mill trade, the demand for boilers, engines, pumps and machine tools is maintained with a steadiness that is satisfactory to the trade.

The Turkey Creek Development Company, J. H. Shearer, Birmingham, Ala., secretary, contemplates the construction of a lake and water-power dam near Birmingham.

The Chattanooga River Power Company, Chattanooga, Tenn., will build a \$1,000,000 steam-power plant, generating 20,000 to 25,000 hp. in connection with the Hales Bar hydroelectric plant now being constructed.

The Sylacauga Ice & Cold Storage Company, Sylacauga, Ala., has been incorporated by A. B. Parker and F. W. Ledbetter, of Anniston, Ala. It will build an ice factory and cold storage plant.

The Tuscaloosa Ice & Light Company, Tuscaloosa, Ala., has arranged for the issuance of \$250,000 of bonds, of which \$175,000 will be used for plant improvement. New machinery will be installed and an entirely new power house may be erected.

A. Daughtry & Son, Metter, Ga., contemplate establishing an electric light plant.

Application has been made at Alamo, Ga., for the incorporation of the Alamo Lumber Company with a capital stock of \$10,000, to manufacture shingles, laths, etc. H. F. Rogers, J. L. Hightower and D. L. Graham are the incorporators.

Wade Bros., Bellwood, Ala., have purchased timber and sawmill interests near Enterprise, Ala., and will improve sawmill.

The Jenkins Lumber Company, Vidalia, Ga., has been incorporated with a capital stock of \$15,000 and privilege to increase to \$50,000. It will manufacture sash, doors, blinds, etc. W. T. Jenkins is principal incorporator.

The Southern Art Metal Company, Americus, Ga., has secured a site for a metal products plants and is ready to erect buildings. C. C. Hawkins is president and L. W. Rose is superintendent.

The Jacksonville Brewing Company, Jacksonville, Fla., has secured a site for a new brewery with a yearly capacity of 30,000 barrels.

The Murphy Chair Company, of Detroit, is offered a site at Bessemer, Ala., for a branch factory.

The city of Birmingham, Ala., has decided to build an additional crematory.

The St. Petersburg Investment Company, St. Petersburg, Fla., and W. C. McClure, Peoria, Ill., have submitted bids for a gas franchise at St. Petersburg.

F. R. Calloway, Chipley, Fla., contemplates establishing an ice factory.

G. M. Heath, T. A. Byrd and others, Enterprise, Ala., are organizing a company to build a 15-ton ice plant.

The Black Marble Company, Gadsden, Ala., has applied for papers of incorporation with a capital stock of \$2,500 to quarry marble. Judge J. A. Bilbro is interested.

L. H. Reynolds and W. J. Mullins contemplate the establishment of a cotton seed oil mill at Clanton, Ala.

Otto Agricola will be general manager of the Hammond-Byrd soil pipe plant at Gadsden, erection of which has begun.

The soil pipe plant of the Southern Pipe & Foundry Company, at Birmingham, Ala., which was burned on February 12, is to be rebuilt. Fire loss is \$75,000. S. F. King is president; W. W. Crawford, vice-president; I. W. Tux, secretary and treasurer.

The Self-fluxing Ore Company has let a contract to Thomas Kennedy, Birmingham, Ala., to sink a mine on Red Mountain. The company, which has offices in Birmingham, will spend \$150,000 in developing self-fluxing ore properties.

The Silurian Ore Company, Birmingham, Ala., has been incorporated by T. H. Aldrich, Jr.; T. H. Aldrich, Sr., and N. L. Steele with a capital stock of \$4,000 to mine ore.

Eastern Canada

TORONTO, ONT., February 15, 1913.

The ratepayers of Chatham, Ont., were almost unanimously in favor of the by-law submitted to them February 6 to give certain municipal privileges to the Chatham Auto Wheel Company. The company will put up a factory to cost \$40,000.

The Remington Arms-Union Metallic Cartridge Company has, according to the Record of Windsor, Ont., decided to establish a plant there. It has purchased a site of nearly 100 acres near the city limits and has given out contracts for the erection of buildings. It is expected to have one building ready in April in which 50 employees can be put to work. The plant at the start will consist of one two-story manufacturing building, approximately 50 x 125 ft., fully equipped with the most modern automatic machinery, safety devices and fire protection apparatus; also a one-story building 16 x 140 ft. for the purpose of housing delicate instruments and testing devices. In addition there will be a power house, equipped with necessary boilers and pumping machinery and three powder magazines constructed with special ventilating systems and lightning arresters.

The Canadian-American Gas & Coke Company, which holds franchises in several American cities, is reported to be negotiating for one in Hamilton, Ont. It would employ 200 men in that city.

The Dominion Manufacturers, Ltd., Toronto, has been incorporated with a capital stock of \$3,000,000. The company will carry on a general manufacturing business.

The Cheddite, Ltd., with its head office in Montreal, and with a capital stock of \$1,000,000, has been incorporated for the purpose of manufacturing dynamite, powder, etc.

The city architect, Toronto, has granted a permit to the Toronto Hardware Mfg. Company for the erection of a three-story warehouse and one-story galvanizing shop on Dufferin street, near Peele avenue. The buildings will cost approximately \$13,000. A permit has also been issued to Delaney & Pettit to erect a two-story brick factory at 105 Jefferson avenue. The estimated cost of building this is \$10,000.

Fire in the factory of the Canadian Rubber Company, Montreal, February 12, did damage to the extent of \$50,000.

The A. B. Ormsby Company, Toronto, has been granted a permit to erect a two-story brick warehouse and factory on the southeast corner of Dufferin and King streets. The new structure will cost \$100,000.

The premises of the Toronto Railway Equipment Company and those of the Bowman Gas Range Company, both on Dundas street, Toronto, were recently destroyed by fire.

The Chatham Auto-Wheel Company, Chatham, Ont., is planning the erection of an auto-wheel plant, the estimated cost of which is \$40,000.

The Kuntz Brewing Company, Waterloo, Ont., is receiving bids for construction of a bottling works and boiler house 68 x 100 feet, two stories and basement, of reinforced concrete, structural steel and brick construction.

The Doherty Mfg. Company, Sarnia, Ont., is having plans prepared for a three-story addition to be made to its factory for the manufacture of stoves.

Western Canada

WINNIPEG, MAN., February 14, 1913.

Plans are now under way for a large amount of building in Western Canada this year. These include many big office and other business buildings. There are also indications of activity in municipal improvements and general industrial expansion. The volume of machinery business at present is comparatively small, but the outlook is even more favorable than a year ago.

Roger Miller & Son, Vancouver, B. C., contemplate establishing a large brick-making plant at Estevan, Sask.

The city of Edmonton, Alberta, is about to prepare to enlarge its waterworks plant. This has been recommended by Francis, Ross & Lea, consulting engineers, Montreal. Plans will shortly be laid before the City Council.

The planing mill of Capt. William Robinson, Selkirk, Man., burned recently while closed down for the purpose of substituting electric motors for steam power. It will be rebuilt at once.

The Alberta-Saskatchewan Paper & Strawboard Products Company, Ltd., Calgary, is preparing to erect a plant at Medicine Hat, Alberta, on a site selected some time ago. It is the intention to build the plant in units, according as business develops.

Smart, Woods, Ltd., bag manufacturers, Winnipeg, have taken out a permit for an addition that will allow them to double the capacity of their plant. The contract has been let to the G. H. Archibald Engineering Company, Ltd., Winnipeg.

Plans were recently completed for the new machine shops and foundry to be erected for the Heaps Engineering Company, on Lulu Island, close to the city of New Westminster. The machinery of the present Schaeke Machine Works, at New Westminster, will comprise part of the plant, and it is planned to eventually install equipment to the value of \$400,000.

The B. C. Electric Railway Company will erect street car repair shops at Burnaby, B. C.

The Town Council of Macklin, Sask., is considering the installation of a waterworks and sewerage system. Robert Orr is secretary-treasurer.

The town of Kerrobert, Sask., is planning the installation of a waterworks system. O. H. Anderson is the clerk.

The Canadian Gas Generator Company, Ltd., is said to be planning to erect a factory at Brandon, Man.

The big packing plant of P. Burns & Co., Ltd., Calgary, Alberta, which burned recently, will be rebuilt on a larger scale, and work will begin at once.

J. F. Diefenbach, described as of the Northland Milling Company, Larimore, N. D., is reported by the Phoenix of Saskatoon, Sask., to have said that he and associated parties will erect and operate a flour mill in

that city of at least 1000 barrels daily capacity, a 60,000-bushel elevator, and a two-story flour house.

J. A. Dailey, Terre Haute, Ind., proposes to erect and operate a large brick and clay products plant at Medicine Hat, Alberta, at a cost of \$150,000. Between 100 and 150 men would be employed. Winnipeg and Regina men are expected to find the capital.

A train of 26 cars, all loaded with tractors, will arrive in Saskatoon, Sask., for the J. I. Case Company in a short time. The company's manager at Saskatoon says that this is an exceptionally early beginning of spring shipments.

In the annual report of the Fort William, Ont., Board of Trade a résumé is given of the various plants establishing here, including the Canadian Car & Foundry Company, the Fort William Starch Works, the McKellar Bedding Company, the Great West Wire Fence Company, the National Tube Company, and the two last additions to industrial activity here: the Maritime Nail Company and the Canadian Steel Foundries, Ltd., as well as the Superior Brick & Tile Company and the Mount McKay Pressed Brick Company. The necessity for providing means for housing the influx of new citizens which new industries will bring was drawn attention to, and the hope was expressed that delay would not occur in this matter, hampering industries by reason of their employees not being able to secure suitable homes.

Government Purchases

WASHINGTON, D. C., February 17, 1913.

The Paymaster General, Navy Department, Washington, will open bids February 25 for the following list of tools:

Schedule 5157, class 31, one patternmaker's lathe with back face plate and tripod.

Schedule 5158, one geared head engine lathe, one upright drilling machine, one friction driven shaping machine, one power hack saw complete, one combined wet and grinding and buffing machine.

Schedule 5159, three 5-kw. motor generator, 500 cycle, quenched-rap radial sets, five 2-kw. motor generator, 500 cycle, quenched-rap radial sets.

Schedule 5160, one electric welding apparatus; schedule 5161, one steam driven air compressor, one 150 ton marine-type high-speed steam-hydraulic forging press, one hydraulic pipe bending press, one single-acting triplex hydraulic pump, one cupola furnace, 2½ to 3½ tons capacity, and one cupola furnace, 1½ to 2 tons capacity, 6 oil burning tilting crucible furnaces, one motor-driven rotary foundry blower, two portable core ovens, one motor-driven buffing lathe, one motor-driven two-wheel emery bench grinder, one cornice brake and folder, one tinsmith's large incased turning machine, one hand operated punch, shear and rod cutter, two hand operated bench punch shear and rod cutters, one deep throat hand punch, five hand operated threading devices, three hand pipe cutting devices, 10 portable air-driven pneumatic piston drills, six chipping hammers, two portable oil burners; schedule 5162, four steel plate ventilating blowers.

The Paymaster General, Navy Department, Washington, will open bids March 5, under schedule 5182, for one open-side planing machine, one No. 0 side horizontal drilling, boring and milling machine for delivery to Annapolis, and one vertical simplex feather weight, double-acting suction valveless air pump for delivery to Boston.

The Isthmian Canal Commission, Washington, will open bids April 14 for furnishing and erecting coal-handling machinery and accessories for two coaling plants.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids March 8 for one 20-ton, four-motor electric traveling crane to be delivered and installed at the navy yard, Portsmouth, N. H.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids March 15 for an ice making and refrigerating plant for the United States naval disciplinary barracks, Port Royal, S. C. The estimated cost is \$6,000.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids February 11 for materials and supplies for the navy yards as follows:

Schedule 5129, class 41, for two 40-in. triple geared variable speed boring and turning lathes—Bidder 86, Niles-Bement-Pond Company, New York, \$14,300.

Alternate A—Bidder 58, I. H. Johnson, Jr., Company, Inc., Philadelphia, \$7,543 and \$8,675; 86, Niles-Bement-Pond Company, New York, \$13,800.

Alternate B—Bidder 86, Niles-Bement-Pond Company, \$500.

Schedule 5130, class 51, one 1000-in. lb. drill, tap, reamer and dies testing machine—Bidder 98, Riehle Bros. Testing Machine Company, Philadelphia, Pa., \$1,800; 135, Tinious Olsen Testing Machine Company, Philadelphia, Pa., \$2,400.

Trade Publications

Plain Radial Drilling Machine.—Dresser Machine Tool Company, Cincinnati, Ohio. Circular. Illustrates and describes a plain radial drilling machine made with 3 and 3½ ft. arms. The special features of the machine, which are a quick return, an extra bearing of the head on the arm, a special arrangement of bearings in the column, a new design of speed variator and the cutting of the spindle rack directly on the sleeve, are shown. Condensed specification tables for both sizes of machine are given and the constant-speed and the adjustable speed motor drives are also shown. An illustrated description of this machine appeared in *The Iron Age*, October 24, 1912.

Electric Grinding Machines.—Racine Electric Company, 506 Matthews Building, Milwaukee, Wis. Two circulars. Describe and illustrate a portable grinding machine for use in connection with small and special tools in machine shops and a larger one which is designed to be mounted in the tool post of a lathe, a milling or a shaping machine. Views of this grinding machine in use on these three machine tools are included.

Pneumatic Hammers.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 124. Pertains to a line of pneumatic riveting, chipping and calking and stone hammers. The different styles are illustrated with brief descriptions of the capacity of each and in addition somewhat more extended tables of specifications are included. Dimensions of the various shapes of chisels used in these hammers are given, together with instructions on the care of pneumatic hammers.

Boilerroom Supplies.—G. L. Simonds & Co., 64 East Van Buren street, Chicago, Ill. Catalogue. Deals with the various members of the Simonds' fuel economy line which includes flue gas analysis instruments, differential draft gauges, soot cleaners for water tube and return tubular boilers, a boiler tube cleaner, check and pump valves, a smoke indicator and a tube extractor. All of these are illustrated and briefly described and in some cases extracts from testimonial letters are reproduced. Partial lists of users of the boilers and the tube cleaner are included.

Blowers and Fans.—Clarage Foundry & Mfg. Company, Kalamazoo, Mich. Catalogue No. 1. Points out the special features of the type SP exhaust fan which are a special type of bearing and an elliptically shaped outlet. The construction of this fan which is made in both the single and double types with a variety of discharges is given in some detail and this is supplemented by a series of line drawings showing the various discharges which can be supplied. Tables of dimensions, specifications and useful information are also included. An illustrated description of this fan appeared in *The Iron Age*, October 17, 1912.

Thermit Welding.—Goldschmidt Thermit Company, New York City. Calendar booklet. Each leaf of the booklet contains the calendar for a month, beginning with February, 1913, and ending with January, 1914. The space above the calendar is devoted to illustrations of various repairs made by the use of Thermit in steel-mills, to castings and forgings, in railway work and a number of marine repairs.

Pyrometers.—Brown Instrument Company, Philadelphia, Pa. Catalogue No. 8. Illustrates a line of electric pyrometers for indicating or recording all ranges of temperatures. The catalogue is divided into two sections, one dealing with electric pyrometers, while the other covers expansion, mercurial and other types. The line of electric pyrometers includes fixed, portable and recording instruments. Mention is also made of the thermo-electric couples used. The second section covers expansion, mercurial, quick-acting platinum and water pyrometers and a recording long-distance thermometer. A partial list of users grouped according to the various industries is included. Among the instruments covered are a radiation pyrometer and a new type of recording pyrometer, both of which were illustrated in *The Iron Age*, December 1, 1910, and October 31, 1912, respectively.

Electrical Repairs.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Folder No. 4239. Calls attention to the repair shops which have been established in various cities throughout the country for the purpose of making repairs to the various pieces of electrical apparatus made by this company. In these shops, the same character of work is done as in the manufacturing plants of the company, and all repairs are guaranteed.

Engine Lathe.—Mueller Machine Tool Co., Cincinnati, Ohio. Circular. Describes and illustrates an 18-in. heavy duty engine lathe. The special feature of this lathe is a very heavy construction, which enables work to be turned out rapidly. The various points about the tool, which can be furnished with either a belt or a motor drive are briefly touched upon. An illustrated description of this lathe appeared in *The Iron Age*, October 31, 1912.

Motor-Driven Portable Elevators.—New York Revolving Portable Elevator Company, Jersey City, N. J. Bulletin No. 21. Shows a number of different types of portable tiering machines with a revolving base equipped with motor drive. The special advantages claimed for the combination of the revolving base feature with a motor drive are speed, economy and ease of operation in stacking bales, boxes, barrels, etc., in storerooms, warehouses and factories. An illustrated description of the earlier type of machine which was not equipped with motor drive appeared in *The Iron Age*, January 2, 1913.

